



Scoping Assessment

A Scoping Assessment to Support an Application for an
Environmental Clearance Certificate (ECC) to Permit the
Construction and Operation of a Bulk Liquid Fuel Storage
and Handling Facility

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Erf 5022, Walvis Bay, Erongo Region

December 2023

INFORMATION SHEET	
Project Title Name	: A Scoping Assessment Report in Support of an Application for an Environmental Clearance Certificate (ECC) to Permit the Construction and Operation of a Bulk Liquid Fuel Storage and Handling Facility @ Erf 5022, Walvis Bay, Erongo Region
MEFT Application No.	: APP-002507
Applicant	: Erongo Petroleum CC Box 5091 WALVIS BAY Erongo Region Namibia
Report Status	: Final
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EXECUTIVE SUMMARY

Erongo Petroleum CC (**EPC**, for short) is proposing to develop and to operate a bulk liquid fuel storage and handling facility on Erf 5022 – a brownfield site in the industrial section of Walvis Bay. EPC has appointed Ekwa Consulting (Ekwa) to attend to its authorisation process for an Environmental Clearance Certificate (ECC). The proposed facility has a designed capacity of 24 000 m³ of automobile diesel oil (ADO) only, stored in six aboveground storage tanks. Erf 5022 measures about 30 250 m² and is fully developed, accommodating a fishing factory which has been in operation for over fifty years. The proposed tank farm will be confined to an area measuring about 5 500 m² where it will occupy a footprint of 3 330 m².

The facility will function as a one-stop fuel service station for fishing vessels operating from the Walvis Bay harbour. Instead of road tankers making multiple trips into fishing factories delivering fuel required by fishing vessels, fishing vessels will simply dock at a 'fuel service station' operated from a jetty terminal in the same way that cars in a town pull up at a filling station. At the one-stop fuel service station, a fishing vessel is refueled and replenished with potable water and fresh supply for the crew. The operation has potential environmental benefits of less traffic congestion on Ben Amathia Street - the main street providing access to most factories and therefore less gaseous emissions and reduced chances of incidents and accidents.

Being a brownfield site, the proposed development will include a huge amount of demolition of old redundant building structures which occupy the 5 500 m². An existing wooden jetty will also be demolished and replaced with a concrete jetty terminal which is more suited for the operations of the envisaged facility. Construction of the new jetty will require piling of concrete pillars into the seabed to support the jetty platform. To accommodate ocean tankers delivering fuel to the facility will require some dredging in order to widen and deepen the channel access leading to the jetty terminal.

The construction activities can be summarised as:

- ✚ Demolition of redundant building structures occupying land with a total footprint of 5 500 m²
- ✚ Demolition of an existing wooden jetty covering a footprint of about 720 m² (60 m long by 12 m wide)
- ✚ Loading of debris from the site and transport to an approved landfill site of Walvis Bay Municipality
- ✚ Piling of concrete pillars on the seabed to support the concrete platform terminal
- ✚ Placement of concrete decks which are cast elsewhere
- ✚ Dredging to widen and deepen the channel access to accommodate ocean tankers delivering fuel to the facility
- ✚ Disposal of dredged material at an offshore site
- ✚ Site preparation and laying out the various project components on the ground
- ✚ Installation of the six fuel storage tanks and accessories
- ✚ Construction of support buildings (admin office, storeroom rooms, ablution facilities, security guard room, etc)
- ✚ Electrical installation
- ✚ Site rehabilitation post construction
- ✚ Startup and site handover.

The operational activities of the facility will include the following:

- ✚ Ocean tankers delivering fuel at the jetty terminal
- ✚ Fuel offloading from ocean tankers and pumping to the storage tanks
- ✚ Safe storage of fuel
- ✚ Fishing vessels docking at the terminal for fuel, food supplies and potable water;
- ✚ Pumping of fuel from storage tanks to the terminal to refuel fishing vessels
- ✚ Loading of road tankers taking fuel to bulk consumers (mines, etc.)
- ✚ Day-to-day management of the facility which include stock level verification, inspection of tanks and pipelines,
- ✚ Maintenance of the facility which includes tank cleaning, waste handling and disposal, etc.

The study has been conducted to identify the nature of impacts which the proposed development will bring to bear to the receiving environment. Given the location and nature of the development, impacts has to be expected on the natural environment, however, such impacts can be reduced or minimised if the measures provided in the EMP are implemented.

Dredging and piling on the seafloor will have some negative impacts to the marine biodiversity and possibly marine traffic disruptions, but the duration is short and the impact footprint is relatively small and can be effectively mitigated. The overall significance rating of such impacts is medium-low without mitigation and low when mitigated.

The impacts that are common to both phases of the development – construction and operation are, health and safety, waste generation, noise pollution, visual (height of tanks is 16.8 m) and marine ecosystem. Noise pollution should at all times be kept under the minimum prescribed by WHO to prevent hearing impairment

and not cause nuisance to the neighbouring residents and the general public. The facility extends its footprint on the ocean water via the jetty, and it is therefore important that measures are taken to prevent waste water and any waste products from entering the ocean at all costs. Any waste generated must be removed from the site and disposed of in an appropriate manner or re-used or recycled wherever possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site and records kept on file.

The fishing sector is a major contributor to the national economy providing direct and indirect employment opportunities to thousands of Namibians. The proposed development will contribute to the local economy by creating new jobs and providing opportunities for skills transfer and continued diversification of economic activities. The biggest benefit from the development is the opportunity to improve overall efficiencies to the fishing sector. By having a common point where fishing vessels are refueled and replenished with food supplies and potable water will eliminate the need to cart fuel to individual factory jetties, making multiple trips in the process, resulting in traffic congestion on the street roads, increased gaseous emissions, noise and increased chances of incidents and accidents.

The study has found that the environmental impacts associated with the construction and operation of the bulk liquid fuel storage and handling facility can be effectively mitigated provided the measures recommended in the EMP are adhered to and implemented.

It is recommended that an ECC be granted to Erongo Petroleum Closed Corporation to construct and operate its project subject to the conditions and terms which the EC may wish to impose.

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ABBREVIATIONS AND ACRONYMS

TERM	EXPANSION
ADO	Automobile Diesel Oil
BAT	Best Available Technology
CH₄	Methane
EC	Environmental Commissioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPC	Erongo Petroleum Close Corporation
ERC	Erongo Regional Council
H₂S	Hydrogen Sulphide
HFO	Heavy Fuel Oil
HPP	Harambee Prosperity Plan
IAPs	Interested and Affected Parties
m²	Square meters
m³	Cubic meter
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MHSS	Ministry of Health and Social Services
MME	Ministry of Mines and Energy
MSDS	Material Safety Data Sheet
NamRa	Namibia Revenue Authority
NDP	National Development Plan
NSI	Namibia Standards Institute
PC	Petroleum Commissioner
PPE	Personal Protective Equipment
SCADA	Supervisory Control And Data Acquisition
SCE	Seal Consulting Engineers
SHE	Safety, Health & Environment
SME	Small and Medium Enterprises
SSC	Social Security Commission
UPL	Unleaded Petrol
WBM	Walvis Bay Municipality
WCF	Workmen Compensation Fund
WHO	World Health Organisation
WM	With Mitigation
WOM	Without Mitigation

DEFINITIONS

TERM	EXPANSION
Assessment	The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making
Business waste	Means any waste generated on any premises used for non-residential purposes, but excluding agricultural properties and small holdings, and does not include general waste, household hazardous waste, garden waste, bulky waste, builder's waste, industrial waste, hazardous waste and health care risk waste
Construction Phase	The phase of a project preceding the Operation Phase, during which project facilities and infrastructure are assembled and installed on their foundations, and connected and tested, to ensure that they operate as designed.
Cumulative Impacts	In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Disposal	Means the discharge, depositing, dumping, spilling, leaking, placing of waste on or at any premises or place set aside by the Council for such purposes, and "dispose" shall have a similar meaning;
Emergency Plan	An emergency plan is a plan in writing that, on the basis of identified potential incidents at the installation together with their consequences, describes how such incidents and their consequences should be dealt with, both on-site and offsite.
Environment	As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".
Environmental Clearance Certificate (ECC)	A certificate and associated conditions issued in terms of the Environmental Management Act, authorizing a listed activity to be undertaken
Environmental Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Environmental Management Plan (EMP)	A working document which contains site project specific plan developed to ensure that environmental management practices to eliminate and control environmental impacts are followed during the developmental phases of that site, project and or facility and would normally consist of construction phase, operational phase and decommissioning phases. Commissioning and Operation phases.
Explosion	An explosion is a release of energy that causes a pressure discontinuity or blast wave
Frequency	The frequency is the number of times an outcome is expected to occur in a given period of time
General waste	Means any waste generated on or at any premises used - (a) for residential purposes, and includes agricultural properties and small holdings; or (b) as public and/or private facilities and institutions but does not include garden waste (unless specifically determined or authorised by Town Council subject to any conditions or limitations the Council may impose), bulky waste, business waste, builder's waste, industrial waste, hazardous waste and health care risk waste.
Hazardous waste	Means - (a) any waste containing, or contaminated by, poison; (b) any corrosive agent; (c) any flammable substance having an open flash-point of less than 90 degrees Celsius; (d) an explosive or radioactive material and substance; (e) any chemical or any other waste that has the potential even in low concentrations to have a significant adverse effect on public health or the environment because of its inherent toxicological, chemical, ignitable, corrosive, carcinogenic, injurious and physical characteristics; (f) any waste consisting of a liquid, sludge or solid substance, resulting from any manufacturing process, industrial treatment or the pre-treatment for disposal purposes of any industrial or mining liquid waste, which in terms of any law, order or directive relating to drainage and plumbing may not be discharged into any drain or sewer.
Industrial waste	Means any waste generated as a result of business, commerce, trade, wholesale, retail, professional, manufacturing, maintenance, repair, fabricating, processing or dismantling activities, but does not include general waste, garden or bulky waste, builder's waste, business waste, hazardous waste or health care risk waste.
Major Hazardous Installation	Major Hazard Installation means an installation: (a) Where more than the prescribed quantity of any substance is or may be kept, whether permanently or temporarily; (b) Where any substance is produced, used, handled or stored in such a form and quantity that it has the potential to cause a major incident (the potential of which will be determined by the risk assessment).
Major Incident	A major incident is an occurrence of catastrophic proportions, resulting from the use of plant or machinery or from activities at a workplace. When the outcome of a risk assessment indicates that there is a possibility
Non-compliance	Issues that are in direct non-compliance with the requirements, commitments and/or management measures as approved in the EMP.
Operational Phase	The phase of a project during which the newly constructed tanks, pipelines, gantries and associated facilities are operated.

Pollution	Means any change in the environment caused by – (a) any waste, substance or matter; or (b) noise, odour, dust or heat, emitted from or caused by any activity, including the storage or treatment of any waste, substance or matter, building and construction, and the provision of any service, whether engaged in by any person or an organ of state if that change has an adverse effect on public health or well-being of people.
Public Participation Process	The process of involving all affected parties in the design, planning and operation of a project. The process requires that the proponents give the parties to be consulted notice of the matter in sufficient form and detail to allow them to prepare their views on the matter. They are also given a reasonable amount of time to prepare their views and an opportunity to present their views to the proponents, who consider the views presented, fully and impartially.
Recovery	Means the process or act of reclaiming or diverting from waste any materials, products or by-products for the purposes of being reused, or collected, processed and used as a raw or other material in the manufacture of a new, recycled or any other product, but excluding the use for purposes of energy generation;
Recyclable waste	means waste which has been separated from the waste stream, and set aside for purposes of recovery, reuse or recycling;
Recycling	Means the process or act of subjecting used or recovered waste materials, products or by-products to a process or treatment of making them suitable for beneficial use and for other purposes, and includes any process or treatment by which waste materials are transformed into new products or base materials in such a manner that the original waste materials, products or by-products may lose their identity, and which may be used as raw materials for the production of other goods or materials.
Recycling Facility	Means a facility which receives any waste, materials, products or by-products for the purposes of recovery, reuse or recycling, and includes a buy-back centre.
Reduction	Means the process or act of reducing the nature, type, quality, quantity, volume or toxicity of any waste generated, and "reduce" shall have a similar meaning
Refuse container	Means any receptacle or other container, including a skip, stipulated or approved by the Town Council from time to time, whether supplied by the Council or not, for the storage, depositing and disposal of waste.
Re-use	Means the process or act of sorting and separating, at the point of origin, different materials found in any waste in order to promote and facilitate recovery, reuse and recycling of materials and resources, and "separate" shall have a similar meaning;
Separation	Means the process or act of sorting and separating, at the point of origin, different materials found in any waste in order to promote and facilitate recovery, reuse and recycling of materials and resources, and "separate" shall have a similar meaning;
Storage	Means the temporary storage or containment of any waste for a period of less than 90 days after its generation and prior to its collection for recovery, reuse, recycling, treatment or disposal;
Vapour Cloud Explosion	The explosion resulting from ignition of a pre-mixed cloud of a flammable vapour, gas, or spray with air, in which flames accelerate to sufficiently high velocities to produce significant overpressure.
Waste	Means any substance or matter whether solid, liquid or any combination thereof, irrespective of whether it or any constituents thereof may have value or other use, and includes – (a) any undesirable, rejected, abandoned or superfluous matter, material, residue of any process or activity, product, by-product; (b) any matter which is deemed useless and unwanted; (c) any matter which has been discarded, abandoned, accumulated or stored for the purposes of discarding, abandoning, processing, recovery, reuse, recycling or extracting a usable product from such matter; or (d) products that may contain or generate a gaseous component

1 PROJECT OVERVIEW

1.1 INTRODUCTION

The proposed project entails the construction and operation of a bulk liquid fuel storage and handling facility to be developed in Namibia's bustling industrial town of Walvis Bay. The facility will have a design capacity to store and to handle 24 000 m³ of exclusively automobile diesel oil (ADO). The development will be constructed on the premises of an existing fishing factory which has been in operations for many years. The premises measure approximately 30 250 m², and the facility will occupy a footprint of approximately 5 500 m² (about 18% of total land). The site is therefore a brownfield one and has to be approached as such.

There are over two hundred commercial fishing vessels catching fish in Namibia waters that dock at various jetty terminals in the harbour. When they dock, these fishing vessels are refuelled, a process which requires road tankers to deliver fuel into fish factories more often making multiple trips to complete refuelling of one fishing vessel. This process has the cumulative negative impacts of traffic congestion on street roads, noise pollution, gaseous emissions and increased chances of road incidents and accidents.

The proposed facility will function as a one-stop fuel service station for fishing vessels operating from the harbour of Walvis Bay. Instead of road tankers delivering fuel to factories, fishing vessels will simply dock at the jetty terminal where they are refuelled and replenished with food and potable water. The

The proposed facility will be constructed on the premises of an existing fishing factory that has been in operation for many years, and will involve a great amount of demolition of disused and redundant building structures as well as an existing wooden jetty terminal.

The site is a brownfield one and will require the demolition of redundant building structures on the premises. A wooden jetty will also be demolished and replaced with a concrete jetty terminal which is more suited for the envisaged operation.

The development requires an Environmental Clearance Certificate (ECC) and Ekwao Consulting ('Ekwao') has been appointed by the project proponent to handle its ECC authorisation process with the Ministry of Environment, Forestry and Tourism (MEFT).

1.2 THE PROPONENT

Details of the proponent are provided in **Table 1**. The lead promoter (Mr J J Doeseb) is a reputable local entrepreneur with business interests in various economic sectors of Namibia including football.

Table 1: Particulars of the Promotor

Details of the Promoter	
Name	Erongo Petroleum CC (or 'EPC', for short)
Registration Numbers	CC/2020/00984
Company Representative	Mr Johnny Johnson Doeseb
Designation	Managing Member
Postal Address	Box 5091, Walvis Bay
Physical Address	Erf 4449 Rössing Street Walvis Bay Namibia Erongo Region
Office Address	Erf 4449 Rössing Street Walvis Bay Namibia
Contact Details	Tel: 081 724 0479 Email: jddoesed75@gmail.com
Company log	

1.3 THE PROJECT BRIEF

The brief from EPC was that the project entails the design, construction and operation of a bulk liquid fuel storage and handling facility on the industrial premises of Erf 5022. A background information document (BID) on the proposed project was prepared and submitted to the office of the EC which allocated the following application number to the project :**APP-002507**. In terms of the screening notice issued by the EC, the scope of the EIA has to cover the following:

- ✚ a Scoping Assessment Report;
- ✚ An Environmental Management Plan (EMP)
- ✚ Public Participation Process (PPP), and
- ✚ A Consent letter from the relevant authority.

EPC has been granted a wholesale license in terms of section 12 (1)(b) of the Petroleum Products and Energy Act by the Minister of Mines and Energy attached to this report as **Annexure A**.

1.4 TRIGGERED ACTIVITIES

The envisaged undertaking is a listed activity which may not be undertaken without an ECC having been obtained from MEFT. The ECC is granted after an Environmental Impacts Assessment (EIA) has been conducted in terms of the Environmental Management Act (EMA) and EIA Regulations as per government gazette (GG. 30 of 2012).

In terms of the Environmental Impact Assessment Regulations (EIAR), as gazetted in the Government Gazette No. 4878 of February 2012, the proposed development has triggered listed activities as tabulated in **Table 2**, below. Listed Activity

Table 2: Triggered Activities

Activity Category	Expansion
Energy Generation, Transmission and Storage Activities	<p>Paragraph 1(c)</p> <p>The construction of facilities for refining of gas, oil and petroleum products.</p> <p>The entails the development of a bulk liquid fuel storage and handling facility.</p>
Waste Management, Treatment, Handling and Disposal Activities	<p>Paragraph 2.1</p> <p>Disposal of waste</p> <p>Paragraph 2.2</p> <p>Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976</p> <p>Paragraph 2.3</p> <p>Temporary storage of waste generated during demolition, construction and maintenance activities.</p> <p>Handling of waste, both non-hazardous and hazardous during the operational phase of the facility.</p>
Water Resources and Development	<p>Paragraph 8.10</p> <p>Reclamation of land from below or above the high-water mark of the sea or associated inland water.</p> <p>(Project likely to involve some dredging to reclaim land for the jetty)</p>
Hazardous Substance Treatment, Handling and Storage	<p>Paragraph 9.2</p> <p>Any process or activity which requires a permit, licence or other form of authorisation, or the modification of changes to existing facilities for any process or activity which requires a amendment of an existing permit, licence or authorisation or which requires a new permit.</p> <p>Paragraph 9.3</p> <p>The bulk transportation of dangerous goods using pipeline, funiculars or conveyors with a throughout capacity of 50 tons or 50 cubic meters or more per day.</p> <p>Paragraph 9.4</p> <p>The storage and handling of dangerous goods, including diesel, petrol, liquid petroleum, gas or paraffin, in containers with a capacity of more than 30 m³ at any one location.</p> <p>Temporary storage of hazardous products during the construction phase, e.g. fuel storage for use by construction vehicles.</p> <p>Paragraph 9.5</p>

Activity Category	Expansion
	Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid, petroleum, gas or paraffin
Infrastructure	<p>Paragraph 10.1 (a) The construction of oil, water, gas or other bulk supply pipelines to the proposed development.</p> <p>Paragraph 10.1 (e) The construction of any structure below any high water mark of the sea.</p>

1.5 EIA OBJECTIVE

The main objective of the EIA is to identify and to evaluate potential risks and or impacts which the envisaged project will bring to bear on the biophysical and socio-economic environments. The information on the project is then presented to the relevant authority, in this case the EC, so as to allow the EC to make an informed decision on whether or not to allow the listed activity.

The EIA process involves a number of phases. Generally, EIAs are undertaken in order to:

- ✚ facilitate the application of the project approval process;
- ✚ incorporate the best environmental option by considering environmental impacts in the planning and design stage of the development;
- ✚ manage risk and avoid project delays, by engaging stakeholders and responding to their concerns and expectations in a timely manner, so as to gain a 'social license' to operate;
- ✚ facilitate effective planning and reduce the potential for creation of liabilities;
- ✚ ensure that impacts, benefits and mitigation plans are identified, and
- ✚ improve project design and execution in respect of all of the above.

The objectives of this EIA are to:

- ✚ establish the baseline conditions of the proposed facility's area of influence prior to construction and operation;
- ✚ conduct a public participation process as part of the impact assessment process during which stakeholders and interested and affected parties (IAPs) are accorded an opportunity to participate in the EIA process;
- ✚ systematically identify and assess material environmental and social impacts that may result from the construction, operation and closure of the proposed facility,
- ✚ develop an Environmental Management Plan (EMP) with a set of recommended mitigation measures or management actions to avoid negative impacts, and, where that is not possible, to reduce the effects of negative impacts and to provide enhance measures where the proposed facility can provide positive benefits,
- ✚ fully integrate the mitigation measures in the design, engineering, planning and execution of the proposed facility, and
- ✚ include an evaluation and assessment of alternatives, including a no project alternative.

1.6 THE SCOPING ASSESSMENT

This scoping assessment was conducted in order to meet the objectives stated above by gathering adequate information on the envisaged development. Information was gathered from Walvis Bay Municipality (WBM) officials, field inspection of the premises where the bulk liquid fuel storage and handling facility will be developed, in order to determine any potential impacts, both negative and positive, which the triggered activities would exert on the bio-physical and socio-economic environments.

Furthermore, these aspects have been considered in the scoping assessment:

- ✚ applicable legislations to the study;
- ✚ public consultation process;

- ✚ methodology followed to assess identified impacts;
- ✚ sensitivity of the receiving environment, and
- ✚ potential ecological, environmental and social impacts.

In the EMP section of the report, practical mechanisms have been recommended on how negative impacts associated with the construction and operation of the facility installation can be eliminated, avoided, reduced or sufficiently mitigated to have no harmful effects. The implementation of the EMP by the proponent will ensure that the construction activities are carried out in a manner that is environmentally sustainable and socially acceptable.

Finally, the gathered information is presented to the EC in order to assist the EC to make an informed decision on whether to grant an ECC with conditions, to grant the ECC without conditions or to reject the application for the ECC altogether.

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

In this section, an overview of the project location, project components and project activities are presented and briefly discussed. The underlying objective to outline the project components and activities is to assist in the identification and evaluation of potential sources of environmental impacts that may arise during the construction and operational phases of the facility.

2.2 PROJECT LOCATION

The proponent is proposing to develop and to operate a bulk liquid fuel storage and handling facility on a portion of Erf 5022 located along Ben Amathila Street in Walvis Bay. The entire land measures about 30 210 m² (3.021 ha) and is fully developed, accommodating a fishing factory that has been in operation for many years. The facility will be developed and confined to a land section measuring about 5 500 m² where it will occupy a footprint of approximately 3 330 m². In figures 1 & 2, the entire Erf 5022 and section earmarked for the development of facility are depicted.

To the west of Erf 5022 is the Atlantic Ocean where a wooden jetty terminal constructed to serve the fish factory extends about 60 m into the sea. To the north and east are several operating fish factories (Fig. 1). Access to the factories is provided from Ben Amathila Street which runs from north to east (Fig. 6). The facility or the tank farm will be developed on the south of the existing land.

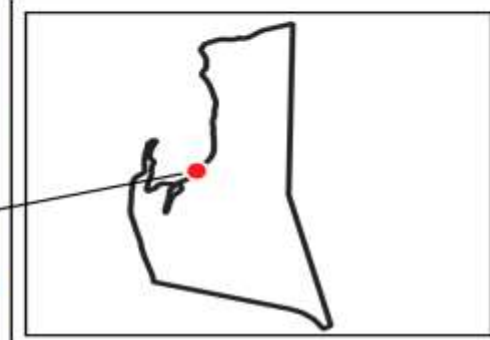
Details of the land with respect to zoning, available infrastructure and services, primary land and consent uses are presented in **Table 3**.

Table 3: Details of the Land

Details of the Land	
Erf	5022
Local Authority	Walvis Bay Municipality
Situate	Ben Amathila Street
Erf Size	30 210 m ² (3.0210 ha)
Zoning	Industrial
Primary Land Uses Allowed	<ul style="list-style-type: none"> • Industrial building, • Light Industry, • Service Industry, • Scrap Yard, • Service Station, • Storage Premises, • Warehousing, • Building Yard
Consent Uses Permitted	<ul style="list-style-type: none"> • Business Premises, • Caretaker Unit, • Noxious Industry, • Retail, • Truck Port, • Office Premises, • Place of Amusement • Place of Instruction
Bulk	1.5 for Primary Uses
Noxious Industries	Must comply with the Health Act as prescribed by WVB Council
Coverage	75% for both primary and consent uses
Parking	1 unit per 66.6 m ² of total floor space
Size of Land Portion Leased	5 500 m ²
Footprint of the Development	3 330 m ²
Services	The project is in a developed industrial section of Walvis Bay and therefore all municipality services (water, electricity, sewerage and waste removal) are available.



PROPOSED BULK LIQUID FUEL STORAGE AND HANDLING FACILITY LOCALITY MAP



- LEGEND**
- Erven
 - Township Extension
 - Town and Townland
 - Bulk Liquid Fuel Storage

Map Drawn by:
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 Ekwao Consulting
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 Ongwediva
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Date: November 2023
 Site Coordinates: Lat: -22.934958; Long: 14.512488

	WALVIS BAY TOWN Walvis Bay Urban Constituency
SCALE: 1:2,500	

Figure 1: Project Location

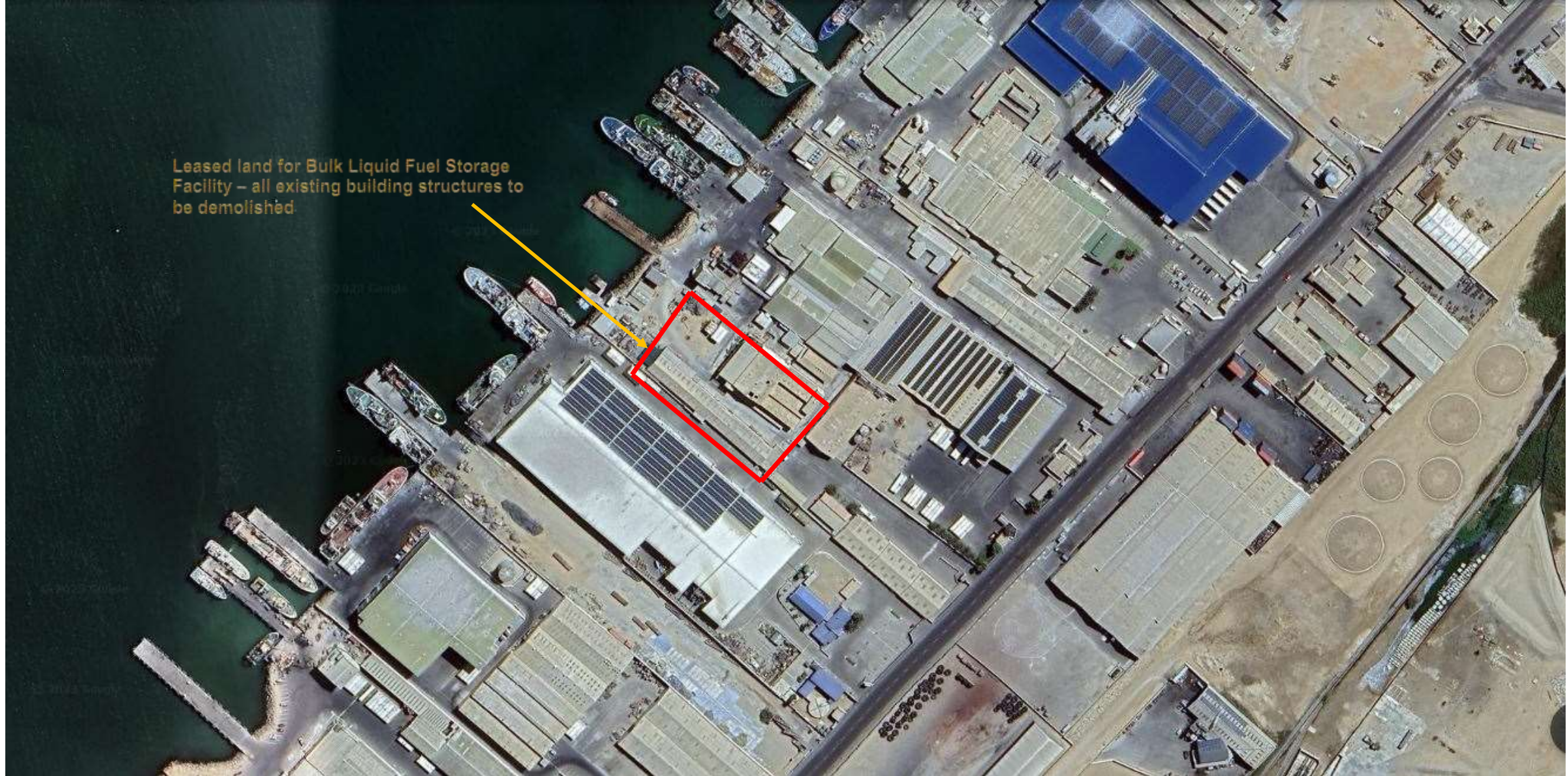


Figure 2: Proposed Site for the Bulk Liquid Fuel Storage Facility

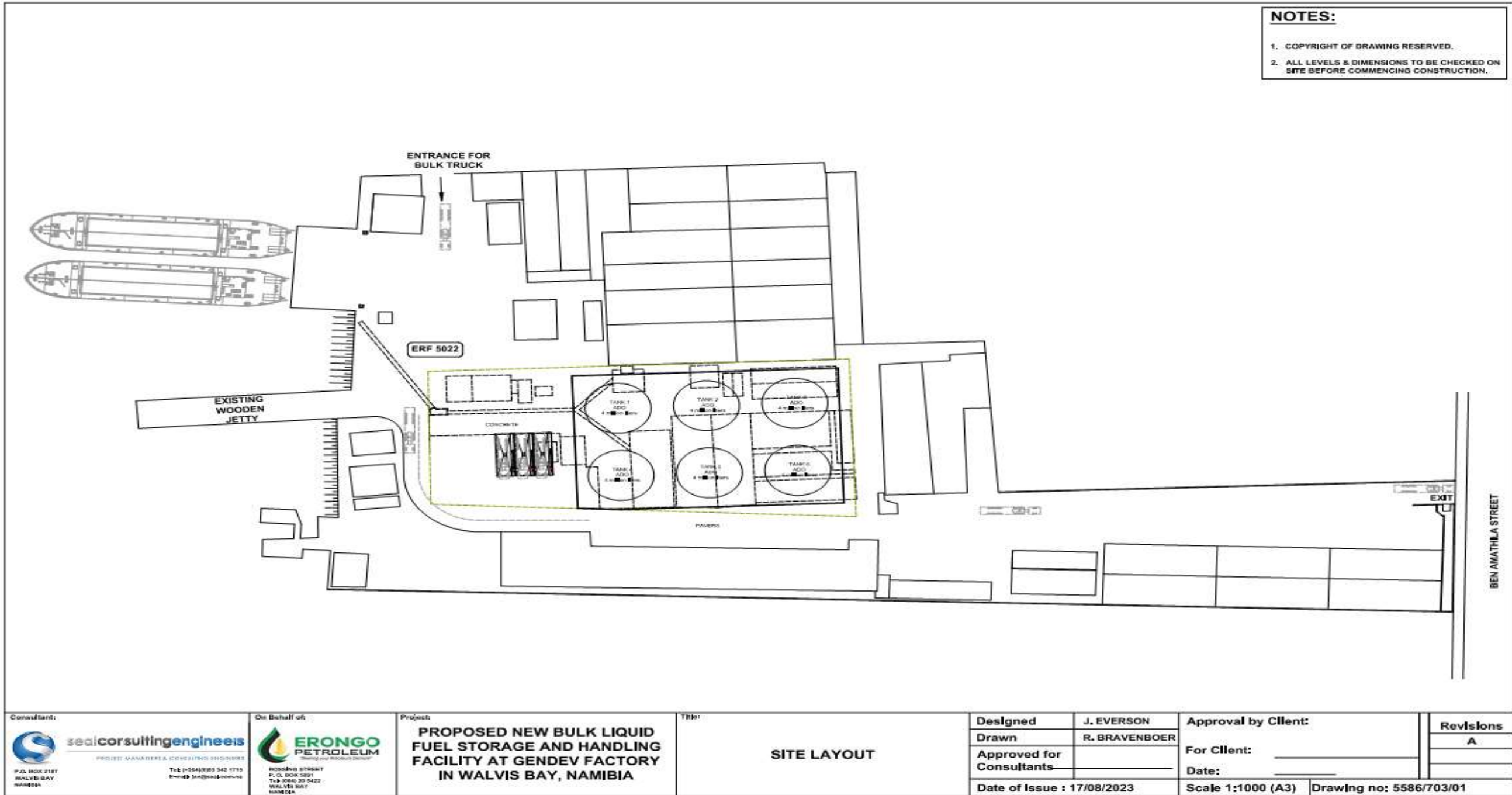


Figure 3: Site Layout – Courtesy; Seal Consulting Engineers)

2.3 STORAGE CAPACITY, FUEL PRODUCTS AND TANK SPECS

The proposed facility constitutes a brownfield site (i.e. the premises is an industrial site, fully developed and accommodates a fish factory which has been in operation for many years). Once fully developed, the bulk liquid fuel storage and handling facility will have a capacity as indicated in **Table 4**. Initially, only one fuel product will be handled, i.e. automobile diesel fuel (ADO), however, the possibility to store and handle other fuel products in the future, is not excluded.

Table 4: Storage Capacity and Fuel Product

Fuel Product	Volume per Year m ³ /Year	Logistics		Tank Size m ³	Number of Tanks (Unit)	Total tankage (m ³)
		Import	Export			
Diesel	288 000	100%	0%	4 000	6	24 000
<p>All fuel will be imported into the country and sold to local end-users. It is projected that about 70% will be sold through the jetty terminal based filling station catering for fishing vessels while 30% will be sold to other bulk end users such as mines and farming enterprises.</p> <p>Export to land locked countries (Zambia, Botswana & DRC) is not considered for the immediate future.</p>						

The six storage tanks are to be installed aboveground, vertical, made of steel and complying with international standards and best available technology (BAT). The dimensions of each tank are:

- ✚ 17.5 m in diameter,
- ✚ 16.8 m in height,
- ✚ 4 000 m³ litres.

The storage tanks will be located within bunded areas in line with the requirements of SANS 10089-1.

2.4 PROPOSED TANK FARM INFRASTRUCTURE

The following infrastructure is proposed for the tank farm:

- ✚ A jetty terminal (where ocean tankers docks to offload fuel. The same jetty will doubles up as a filling station where fishing vessels are refueled, replenished with food supplies and potable water);
- ✚ Conveying pipeline from the jetty terminal to the storage tanks;
- ✚ Six aboveground storage tanks;
- ✚ Road tanker loading bay;
- ✚ Utilities;
- ✚ Support building infrastructure:
 - an administrative building;
 - an ablution and rest room;
 - a storeroom/ workshop/warehouse;
 - a security guard house;
 - a fire /form pumping station
 - a road tank wash bay;
 - facility internal routes and parking areas;
 - electrical substation or standby generator or photovoltaic plant;
 - an associated light and closed circuit television (CCTV), and
 - a truck entrance/exit gates and emergency exists.

The storage tanks will be designed to appropriate local and international standards according to the latest versions of SANS 10089-1:2008: Storage and distribution of petroleum products in aboveground bulk installations.

API 650: Welded Steel Tanks for Oil Storage, and



Figure 4: Pipeline Network in a concrete sleeve with the jetty terminal in the background



Figure 5: Entry and Exit Point to the Proposed Site with fuel storage tanks in the background



Figure 6: View of Ben Amathila Street that provides access to fishing factories

2.5 PROPOSED FACILITY LAYOUT

An conceptual layout for the proposed facility as prepared by SCE is presented Fig. 3. The final internal layout of the facility as presented could slightly change due to prevailing site conditions after demolition of old building structures and clearing activities have been completed. The position of the tank farm will be as follows:

- ✚ ±25 m from the south western boundary
- ✚ ±143 m from the south eastern boundary
- ✚ ±73 m from the north eastern boundary
- ✚ ±70 m from the quay (the north western boundary)

The conveying pipeline between the terminal and storage tanks will run in concrete sleeves on the terminal section and aboveground onshore, except where it crosses site internal routes where it will be buried in the ground (as shown in Fig.4). Provision has been made on the indicative layout, for the tank farm to have separate entry and exit points as shown with adequate parking provided for road bulk carriers. The current entry and exit point to the proposed project is as depicted in Fig. 5. The proposed road truck loading bays is also indicated on the conceptual layout. The site has a boundary wall which will be retained.

All support buildings for the facility: the main office building, ablution facility, storeroom, workshop, fire/foam, control room, firefighting station, will be located on the southwest extent section of the land.

The indicative site layout presented in Fig. 3 has been used as the base case for the impact assessment presented in this report.

2.6 ACTIVITIES AND OPERATIONAL SERVICES

The following standard activities, operational services and functions are required and or will take place at the proposed facility:

- ✚ Ocean tankers unloading (pumping fuel from the vessel at the jetty terminal to the storage tanks);
- ✚ Refueling fish vessels (pumping fuel from the storage tanks to the fishing boats at the jetty terminal);
- ✚ Road truck loading (fuel from the storage tank to road tankers to bulk users);
- ✚ Internal tank-to-tank transfer;
- ✚ Storage tank measurement on site;
- ✚ Storage tank water drainage activities/services;
- ✚ Storage tank cleaning and emptying activities/services;
- ✚ Separate pipeline pigging, cleaning and purging;
- ✚ Full firefighting equipment;
- ✚ Cleaning of road tankers;
- ✚ etc.

2.7 CONSTRUCTION ACTIVITIES

Construction will, amongst others include the following:

- ✚ Demolition of an existing wooden jetty
- ✚ Demolition of old building redundant structures
- ✚ Dredging and piling activities
- ✚ Removal of debris
- ✚ Site preparation
- ✚ Excavations and earthwork for new building structures
- ✚ Installation of tanks, equipment & accessories
- ✚ Building of support infrastructure and accessories

2.7.1 DEMOLITION OF THE WOODEN JETTY

The existing wooden jetty seen in Figures: 7 & 8 will be completely demolished and replaced with a new concrete terminal which is more suited for the proposed development. The footprint of the existing wooden jetty is about 720 m² (60 m long by 12 m wide). At the time of preparing this Scoping Assessment, SCE were uncertain as to whether the footprint of the jetty will be kept the same or whether it will be slightly increased.

The jetty is a vital component to the development of the facility. Ocean tankers delivering bulk fuel to the facility are anchored on the particular jetty. The fishing vessels that dock for refueling are also anchored on the same jetty. Additionally, critical support accessories will also be installed on the jetty, i.e. the pipeline through which fuel is pumped to the storage tanks, and pipeline through which fuel is pumped from the storage tanks to the fishing vessels, potable water to the fishing vessels, and as a walkway for personnel providing services. Several marine mammals such as seals are using jetties for 'sunbathing' while birds also hover around for any leftover food. (Figures: 13 & 15)

Potential Impacts

Marine creatures such as oysters, bryozoans and algae are known to establish habitat on submerged man-made structures such as wooden jetties. The wooden jetty to be demolished has been in existence for many years and it is therefore home to many such creatures,

The demolition of the jetty structure will result in the destruction of such habitat with most creatures ending up in debris. It is important that demolition be carried out in a manner that gives such creatures an opportunity to escape.

2.7.2 DEMOLITION OF REDUNDANT BUILDINGS AND STRUCTURES

All existing disused building structures on the 5 500 m² land portion intended for the development will be demolished while loose items will be removed. This activity will be a major undertaking given the number of building structures involved. Some of those structures are presented in Figures: 9 & 10. Debris should be treated as hazardous waste materials and must be temporarily stored on site and transported to the landfill site of Walvis Bay municipality by a company with suitable vehicles to handle hazardous waste products. Records of hazardous waste removed must be kept at the construction site office.

Potential Impacts

Demolition will generate a huge amount of debris. Dust pollution will be a major factor during this activity. Some building structures were built in the fifties and could potentially contain asbestos. If materials containing asbestos are disturbed, tiny asbestos fibers are released into the air. When air containing asbestos particles is breathed in, such fibers can get trapped in the lungs and can develop into health problems.

2.7.3 REMOVAL OF DEBRIS

Since industrial activities have been conducted on the premises for many years, it is proposed that all debris from demolished structures be approached and handled as hazardous waste materials. Temporary storage of such materials at the site prior to disposal must be well planned and carefully executed. Adequate suitable waste skips must be provided into which debris is stored. Dumping debris on pervious surface area has the potential of such hazardous materials infiltrating into the surface and possibly contaminating source of water.

H₂S has a bad odour which could be a public nuisance while asbestos could escape into the air becoming a potential health hazard. Suitable PPE should be provided to the personnel handling debris from the site.

Potential Impacts

Poor handling of debris from demolished structures and potentially contaminated dredged materials has the potential to pollute the environment and or to become sources of public nuisance.

2.7.4 SITE PREPARATION

Once the site has been cleared of demolished debris it is prepared for the actual construction work for the bulk liquid fuel storage and handling facility to begin. The positions of the various components of the facility (concrete jetty, storage tanks, support buildings, pipelines, cables, pump stations, etc.) are demarcated as per the final layout prepared by CSE. Activities identified as specialised ones are dredging, piling and storage tank installation.

2.7.4.1 Dredging

Some dredging will be required to possibly widen and deepen the entrance channel to the jetty terminal, so that ocean tankers delivering fuel can be easily maneuvered into position. Ocean tankers are relatively larger than fishing vessels for which the jetty was originally designed. Dredging can be achieved in three methods – mechanical, hydraulic and hydro-dynamic with each method using different techniques and equipment. Typically, a dredger collects dredged materials inside a hopper and disposed it to a disposal site or delivers the dredged material to a disposal site via a pipeline.

During dredging, large volumes of dredged material can, potentially be generated which requires safe disposal. Depending on the volumes involved, dredged material can be disposed of either at sea or onshore at an approved landfill site. At Walvis Bay, Nampont has a designated offsite site for the disposal of dredged material and can be approached when the volumes have been estimated.

While it is expected that sediments around the factory jetties are contaminated due to factory operations and movements of fishing vessels over the years, dredging has the potential to disturb the seafloor and to stir up sediment leading to increased suspended sediment and possibly turbidity in the water column within the immediate area and down current from the source.

The type of dredger to employ is characterised by a range of factors such as:

- ✚ the topographic terrain;
- ✚ volume of materials to be dredged;
- ✚ sea depth where dredging is required;
- ✚ distance to disposal site;
- ✚ method of disposal of dredged materials;
- ✚ contamination levels of the materials to be dredged;
- ✚ environmental impact;
- ✚ costs involved, and

- ✚ availability of suitable dredgers.

For this project, it is important to select the dredger which will have the least impacts on the environment.

Potential Impacts

Dredging has the potential to crack open pockets of Hydrogen Sulphide (H₂S) or even methane (CH₄) on the ocean floor. H₂S is poisonous and highly flammable and has a strong smell (smells like rotten eggs). CH₄ is also highly flammable and can kill human very quickly. Dredged material has to be treated as hazardous waste and handled with caution.

Another potential impact related to dredging is that of marine traffic disruptions. Unless well planned and coordinated, dredging activities have the potential to disrupt marine traffic around the harbour.

2.7.4.2 Piling for the Concrete Jetty Construction

The concrete jetty proposed to replace the wooden one will be similar to such typical jetties used in the port of Walvis Bay. The construction technique will also be similar. Rectangular concrete piles and concrete jetty decks of suitable sizes and design specifications are cast, not in situ, but on land and brought to the site. Each concrete pile is put in place by a crane while it is being supported by a temporary steel guide. The pile is then driven down mechanically penetrating the seabed up to the required depth. Once the first four piles from the shore have been inserted, a precast section of the jetty deck is put in place. The precast is then covered with in situ cast concrete to finish this section of the jetty off. The crane used in the operation moves along the already completed section of the jetty moving seawards until the entire jetty construction is done.

Potential Impacts

Same impacts as for dredging should be expected during piling.

2.7.4.3 Civil Works

This will include the following:

- ✚ Structural and mechanical erection of facilities
- ✚ Piping fabrication and installation
- ✚ Electrical installations
- ✚ Instrumentation installations
- ✚ Insulation and
- ✚ Pre-commissioning

2.7.5 TANK FARM SUPPORT INFRASTRUCTURE

2.7.5.1 Offices and Amenities

The main building will accommodate the control room, management offices for administration and operations management facilities. The control room should be equipped with computers and field device data logging systems on a system control and data acquisition (SCADA) which provides the Fuel Depot Manager with process control, data acquisition and site monitoring functions

2.7.5.2 Security and Access Control

Access to and from the facility must be strictly controlled on the basis 24/7. A security personnel and a security guard house should be provided at the entrance, which will be equipped with air conditioning, toilet facilities and kitchenette. Modern reliable system must be used as means of security for the tank farm. The periphery should be enclosed by a suitable foundry wall and monitored by closed control television (CCTV).

2.7.5.3 Wastewater Disposal

Process wastewater (oily water) which will mainly consist of tank bottom drainage, containment stormwater runoff, including water from tank leaks and spills that collect in the containment sump, as well as liquefied hydrocarbons from the vapour recovery unit. Other sources include contaminated water from tanker washing, and wastewater from the vapour recovery process. Oily water has to be channeled via internal oily water sewer to the oil-water interceptor separator.

Recovered oil is to be pumped to the slops tank, and water from the separator will be sampled to ensure compliance with legislated requirements of WBM for water quality prior to release to the municipal sewer system. Wastewater generated from the toilet facilities and ablutions will be disposed of into the municipal sewer system.

2.7.5.4 Firefighting System

Key fire protection features should include adequate tank spacing, overflow protection, bunded areas for spill control, fixed fire protection system, water and foam supply. Fire systems will be designed to the specs of SANS 10089-1. This should apply to the main fire water storage, pumping and reticulation, tanks shell cooling, with fire water, foam pouring for bund and tank top and vapour spaces, bund foam pourers, and foam canons to be mounted at the selected points per fire plan.

Fire hydrants of a standard, double outlet design should be provided at strategic locations, within 75 m of all buildings, structures or tanks. An adequate amount of hose, nozzles, portable deluge sets, and other equipment should be provided. This equipment will be located on vehicles and in hose enclosures throughout the facility.

2.7.5.5 Electrical and Instrumentation

- Power Supply

The facility will require an uninterrupted power supply system to feed all components of the facility that have to be identified as requiring power in an emergency situation or sensitive to fluctuations in the supply of voltage, including a selection of local real lighting. A standby genset will be required for this purpose.

- Site lighting

A mixture of LED and other lighting systems should be used for economy of consumption. Adequate lighting should be provided for areas that will be accessed and operated during night operations, as well as for security purposes. The lighting should be designed in manner that ensures that sufficient light is available for the CCTV system to operate. Alternative forms of energy supply such as solar and wind should be explored during the design stage in order to reduce the carbon footprint of the facility.

2.7.5.6 Control and Instrumentation

Automation or instrumentation should be as per the latest terminal automation system philosophy, which amongst other things, includes the following:

- ✚ Deport automation system, tank farm management system, etc. (this shall be field device control and data logging system which provides management of the facility with a system process control, and data acquisition and site (SCADA) monitoring functions.
- ✚ Field devices and instruments including radar gauges, multi-point temperature sensors, pressure transmitters, overflow detection and audio, visual alarm system.
- ✚ Vessel refueling system which includes mass flow meters, batch controller, etc.
- ✚ Tank truck loading system including mass flow meters;
- ✚ Control room equipment with servers, PLCs, UPS, etc.
- ✚ Position sensors for bund valves, etc.
- ✚ Safety shutdowns system covering automated overflow protection;
- ✚ Meters proving and calibration facilities;
- ✚ Air dryer, air receivers and piping for pneumatic systems;
- ✚ CCTV system to cover the total facilities;
- ✚ Hydrocarbon detectors and flow sensors, etc. near all potential leak sources

2.7.6 ANCILLARY INFRASTRUCTURE REQUIRED FOR THE CONSTRUCTION

No major infrastructure is required on site for the construction of the development. The required infrastructure for the purpose of supporting services is discussed below:

2.7.6.1 Security

A temporary construction camp to house the machinery and equipment of the contractor will be erected on site for the entire duration of the construction phase. A security guard will also be required to be posted on site during non-construction times. A security fencing is not required because the entire premises has boundary walls around it.

2.7.6.2 Sanitation

During the construction phase of the project, temporary toilets can be erected and connected to the sewerage system on the premises. One toilet per 15 workers is recommended. More details are provided in the EMP.

2.7.6.3 Water

The contractor will be required to apply for water connection for its use during the duration of the construction period. The water requirement for construction activities is not expected to burden the water availability of the town.

2.7.6.4 **Contractor's Camp and Laydown Areas**

Designated areas will be established on the premises during the construction phase for the safe storage (parking) of construction machinery, equipment and vehicles.

2.7.7 DECOMMISSIONING PHASE

Considering the CapEx investment (N\$250 million) required for the development, decommissioning of the facility is not envisioned in the short to medium term. The facility is expected to have an operational lifespan in excess of 30 years. However, in the event of the facility having to close down due to factors beyond the control of the promoter or management, i.e. sabotage, fire, economic meltdown, etc., decommissioning should be carried out in compliance with the appropriate environmental legislation and best available technology at that time.



Figure 7: Existing Wooden Jetty to be Demolished



Figure 8: Fishing Boats Anchored at the Wooden Jetty



Figure 9: Scout Rocks with Fishing Boats Anchored at Neighbouring Jetties



Figure 10: Building Structures to be Demolished



Figure 11: Redundant Building to be Demolished



Figure 12: Loose Items on the Premises

3 NEED AND DESIRABILITY

In this section the need and desirability for the project is discussed from these perspectives:

3.1 NEED JUSTIFICATION

Based on the publications obtained from the Ministry of Fisheries and Marine Resources (MFMR), over 200 fishing vessels and boats of different sizes and capacities are registered with the ministry for purposes of harvesting marine resources in the Namibian waters.

Fishing vessels equipped with onboard processing facilities would dock in the port while those without onboard processing facilities would normally dock at private jetty terminals constructed and operated by fishing companies on their respective premises. This is where frozen fish is offloaded from fishing boats/vessels.

During the offloading, the fishing vessel is refueled and supplied with potable water and food items for the crew. Given that a sizeable fishing vessel can take in anything between 50 000 litres and 200 000 litres of fuel, refueling is a time consuming exercise requiring road tankers to make multiple trips between the fuel depot and the factory premises to complete the refueling. Depending on the payload of the road tanker used, the refueling activity can take as long as 48 hours.

EPC would like to exploit a niche market in the fishing sector by providing a unique service whereby fishing boats are refueled from the bulk liquid fuel storage and handling facility. Essentially, the facility will function as a one-stop fuel service station for fishing vessels. Instead of road tankers delivering fuel to individual factory premises for re-fueling, the fishing boat is simply steered to the 'filling service operated from a jetty terminal' where refueling is done with pumping equipment delivering as much as 1 500 litres of fuel per minute. Replenishing the vessel with food items and potable water for the crew is also done at the facility during refueling. This will increase the fishing vessel's turnaround time, hence improved efficiency and ultimately the bottom line of the fishing company

The promoter will be leasing land from a fish company in the town of Walvis Bay. The land use, size and supporting infrastructure are presented in **Table 2**:

3.2 DESIRABILITY JUSTIFICATION

The project has the potential to reduce the docking time of fishing vessels which will ultimately lead to the overall efficiency in the fishing sector. The reduction of multiple trips made by road tankers into factory premises for refueling will have environmental benefits:

- ✚ reduced traffic congestion at fuel depots
- ✚ reduced traffic congestion on Ben Amathila Street,
- ✚ less gaseous emission from road tankers making multiple trips into factories for refueling
- ✚ less noise pollution
- ✚ reduced potential risk for road incidents and accidents on Ben Amathila Street

At present tank farms in Namibia are owned and operated by four multinational companies while NamCor (of Namibia) is still trying to get its foot in the industry. These are:

- ✚ Puma – Sweden
- ✚ Shell/Vivo – Netherlands
- ✚ Engen – Singapore
- ✚ Total – France
- ✚ NamCor – Namibia

By law, NamCor should be handling 50% of fuel imports into Namibia, however, this is a long term goal which will take several years to be attained. Challenges faced by the industry include:

- ✚ Lack of access to storage facilities for independent wholesalers, because existing storage is controlled by the four multinational companies mentioned above.
- ✚ Local wholesalers are unable to import their own product, and as a result relegated to middle-men resulting in minute profit margins.

The fact that the promoter will source and procure its fuel from international markets has the potential benefits to improve the overall fuel security in the country while at same time promoting, both competition and participation of indigenous Namibians in the downstream fuel distribution.

4 PROJECT SITE BASELINE ANALYSIS

A brief baseline of the project site is presented in **Table 5** below. Only those aspects that have a bearing on the project have been presented.

Table 5: Project Site Characteristics

Particulars	Details	Environmental Impacts/Considerations
Project Location	Walvis Bay Municipality, Erongo Region.	
Project Site	Erf 5022, Ben Amathila Street, Walvis Bay	
Surrounding Land Use	The land is used as a fishing factory and all neighbouring lands are used as fishing factories.	The proposed activity is allowed for and no rezoning will be required.
Longitude	17° 25' 59" South	
Latitude	15° 40' 59" East	
Topography	Flat	
Road Infrastructure	Site is accessed from a paved street road. The town of Walvis Bay is serviced by good roads including the recently constructed dual carriageway between Swakopmund and Walvis Bay. Railway service is also present in WVB. The project site is not served by a railway siding.	The product from the facility will service the fishing sector (80%) and 20% private fuel retailers. The distribution of fuel to retailers will not lead to traffic congestion on national roads.
Available Services	The land is fully serviced with potable water, sewerage, electricity, refuse removal, etc. available.	The project's water, electricity and sewerage requirement is not expected to exceed the available services.
Nearest towns	Swakopmund (30 km) Arandis (80 km) Henties Bay (120 km)	Minimal employment will be created and no influx of people into neighbouring towns is expected.
Nearest airport	Walvis Bay International Airport – 15 km	
Nearest Hospitals	Walvis Bay State Hospital Welwitschia Private Hospital	
Surface waterbodies	The Atlantic Ocean is the permanent waterbody and a section of the project (jetty terminal) will be constructed on the 'surface of the water'. The Kuiseb River is the non-perennial river in the area but it has not drained into the Atlantic Ocean for seventy years.	Construction and operational activities at the facility have the potential to cause pollutants to enter seawater which could be propagated by wave actions to seawater intakes of fishing factories lying further north of the project site.
Communication	Mobile and land based telecommunication infrastructure are available.	
Climatic Conditions	The climatic environment over the project site is influenced by the Benguela Current – a cold, wide current that flows northwards along the west coast and the South Atlantic Subtropical Anticyclone (SASA) – the semi-permanent atmospheric pressure circulation over the South Atlantic Ocean.	The interactions of the Benguela Current and SASA is responsible for the production of nutrients which support the abundant marine life which made Namibia a fishing nation. Major pollution could therefore have devastating impacts on the marine ecosystem.
Rainfall	On average WVB receives about 50 mm of rainfall per year. As such street roads are built without any drainage systems in place. In recent years, heavy downpours have occurred in WVB, possibly due to global warming, which resulted in flooded streets, causing complete chaos and bedlam amongst the locals. Fog which occurs for about 900 hours per year is the main source of water for plants and animals found on the coastal desert.	Occasionally, rainfall events may occur which has the potential to wash away pollutants present at the facility, especially on the jetty, into the sea.
Temperature and Wind Conditions	Average annual temperature at the project site is about 18 °C, with the maximum seldom exceeding 28 °C. The lowest rarely goes below 5 °C. Occasionally extreme wind conditions (Berg-Winds) are encountered reaching speeds of 60km/hr causing temperatures to sour in the upper 30-ties.	Wind direction should be taken into account when stockpiling construction materials that are prone to wind erosion such as building sand. Handling of hazardous products (fuel offloading and discharging) should be suspended during events of berg-wind conditions. Periods of strong westerly to south-westerly wind, as well as north winds may carry airborne dust to nearby sensitive receptors
Evaporation	Average mean annual evaporation as measured from coastal salt operations which utilise seawater as raw materials is upwards of 3 000 mm. Any fuel exposed to the environment will rapidly evaporate into the atmosphere.	Air pollution levels have been listed as unhealthy for sensitive people at Walvis Bay. The main pollutant is PM _{2.5} which is eight times higher than the concentration levels recommended by WHO. Unless mitigation measures are implemented, the project has the potential to contribute to PM _{2.5} levels.

Soils	Soils encountered at the project site is formed under arid conditions with the process achieved through physical weathering, chemical weathering and transportation mostly by wind. The nature of the soil is that it has a high salt content and characterised by poor drainage or little ability to retain water and therefore unsuited to support vegetation.	The soil has poor drainage capabilities and any hydrocarbon spill or leak will rapidly infiltrate into the soil with the potential to contaminate groundwater.
Geology	The bedrock on the coastal area of Walvis Bay is expected to be at depths of 35 m below the surface water. The sediments covering the bedrock consist of medium to coarse grain sand mixed with clayey materials.	Knowledge of the local geology is critical and should be considered during the design phase to ensure that the correct concrete strength is used during piling of the jetty structure.
Aquatic Environment	The predominant current flow along the Namibia coast is the Benguela Current which flows in the north westerly direction at speeds ranging between 0.15m/s and 0.35 m/s. The highest astronomical tide recorded has been +1.90 m while the mean high has been +1.69 m. The lowest average mean recorded has been +0.27 m Daily tidal forecast data are available from Namport.	Construction and operational activities at the facility have the potential to cause pollutants to enter seawater which could be propagated by wave actions to seawater intakes of fishing factories lying further north of the project site.
Corrosive Environment	Walvis Bay has the highest levels corrosiveness when compared to other coastal towns in Southern Africa. This is due to high levels of salt in fog and periodic release of hydrogen Sulphide from the ocean.	Levels of corrosion may be high and should be kept in mind when planning for the procurement of equipment for the facility and the maintenance of such equipment.
Groundwater	In Walvis Bay, groundwater is found ± 2 m below the natural ground level and is saline, hence not fit for human consumption. Potable water for Walvis Bay residents is sourced upstream, from boreholes sunk along the banks of Kuiseb River.	Pollution of groundwater is prohibited. Correct storing and handling of hazardous products is therefore required. Regular maintenance of facilities must be carried out to ensure that no leaks or spills occur from such facilities.
Marine Biodiversity	The project site is an area which has been cleared of vegetation and therefore completely transformed into an industrial commercial section of the town. About 4 km south of the project site is the WVB lagoon – a wetland of international importance where thousands of Flamingos and Pelican birds congregate. Another wetland which is manmade are the sewerage ponds to the southeast of the project site about 2.8 km away. Species such as whales, dolphins and seals found on the coastal areas are widely admired by humans and continue to attract hundreds of tourists to the coast. The role of such species in the ecosystem is also of significance important. (Figures: 10 & 11)	Construction and operational activities of the proposed facility have the potential to impact on fauna environments if pollutants enter the marine environment. It has been proven that birds flying at night can be disoriented and even collide into structure as a result of lighting.
Archaeological, Cultural and Heritage Aspects	The project site is located in an urban environment which is completely developed and there has been no archaeological resources discovered or recorded in the past. No other structures, sites or spheres of heritage of cultural significance was determine to be close.	Items of heritage and cultural significance have been found at the Walvis Bay salt works about 10 km south of the project site.
Demographic Environment	As the economic capital of the country, Walvis Bay urban has a population estimated by Namibia Statics Agency at 62 096 people in 2014. Others have estimated the population as high as 100 000. Economic activities in WVB include fishing, shipping, freight, tourism and services which attract hundreds of jobseekers to the town. The deep port at WVB is also serving seagoing freight from land locked countries of Zambia, DRC, Botswana including the southern parts of Angola.	The envisaged facility will provide employment opportunities to skilled, semi-skilled and non-skilled people during the construction and operational phases of the development. Prospective employees will be hired from WVB and surrounding towns Swakopmund, Henties Bay and Arandis.



Figure 13: A Seal taking a break on the Jetty to be demolished



Figure 14: Flamingos scavenging on sewerage ponds of Walvis Bay



Figure 15: A bird flying around the jetty

5 THE REGULATIVE FRAMEWORK

For development to take place on a sustainable basis, government has formulated laws, rules and policies that require the implementation of all those projects considered to have an adverse impact on the environment, to be preceded by an environmental scoping assessment. Some of the laws that are applicable to the activity envisaged by the promoter are as listed in Table below.

Table 6: Legislative Framework

Legislation	Main Aspects
Environmental Management Act (Act. No. 7 of 2007)	<ul style="list-style-type: none"> a) It defines what the environment is and encourages sustainable management of the environment when natural resources are being exploited/extracted for the benefit of the residents/citizens. b) It also provides for a process of assessment and control of activities that are likely to pose significant effects on the receiving environment.
Environmental Management Regulations (Gazetted on 12 February 2012)	<ul style="list-style-type: none"> a) Heralded the implementation of the Environmental Management Act almost five years after the Act was approved by the legislature. b) Presents a list of activities that require an ECC prior to commencement. c) Regulates and provides guidelines on how EIAs must be conducted.
Petroleum Products and Energy Act (Govt Gazette No, 5222, 14 June 2013)	<p>The Act regulates the licensing and certification of fuel outlets including related facilities such as LGP bottling plants.</p> <p>Section 3 (1) states that</p> <p>No person shall</p> <ul style="list-style-type: none"> a) operate a retail outlet or conduct the business of a wholesaler, unless authorised to do so under a retail licence or wholesale licence, b) operate a consumer installation, inless authorised to do so under a certificate, and c) shall possess or store any fuel <p>(2) No person shall possess or store any fuel except under authority of a licence or a certificate, excluding</p> <p>Minister of Mines and Energy has under regulation 44 of the Petroleum Products Regulations approved the use in Namibia of these specifications, standards and code of practice:</p> <p>the American Standards Institute (ASI)</p> <p>the British Standards Institute (BSI)</p> <p>the South African Bureau of Standards (SABS)</p> <p>the South African National Standards (SANS) and</p> <p>the United Kingdom Ministry of Defense (UKMoD)</p> <p>SABS 0131-1 : 1977 – The storage and handling of liquid fuel Part 1 – Small consumer installations</p> <p>SABS 0131-2 : 1979 – Storage and handling of liquid fuel Part 2 – Large consumer installations</p> <p>SABS 0131-3 : 1982 – The storage and handling of liquid fuel Part 3 – Bulk low-flash point fuel storage and allied facilities at large consumer installations.</p> <p>SABS 0108 – Classification of hazardous locations and selection of apparatus for use in such locations.</p>
Communal Land Reform Act (Act 2 of 2005)	<ul style="list-style-type: none"> a) Provides for the allocation of rights in respect of communal land b) Establishes the Communal Land Board c) Provides for the powers of Chiefs and Traditional authorities
Labour Act (Act 11 of 2007 as amended)	<ul style="list-style-type: none"> a) The Act contains extensive and detailed provisions relating to the basic employment conditions, rules regarding termination of employment, dismissals and disciplinary action. b) It also provides for the prevention of trade disputes, unfair labour practices, regulates and controls collective job action, employment agencies and all matters incidental thereto.

	<p>c) The Act also provides the right to the employees to speak about work conditions, the right to say no to unsafe work, the right to be consulted about safety in the workplace and the right to workers compensation.</p>
<p>Public and Environmental Health Act (Act No. 1 of 2015)</p>	<p>a) The Act provides for a legal framework for a structured more uniform public and environmental health system and for matters incidental thereto.</p> <p>b) It deals and provides guidelines on noise generation and control thereof within an urban environment.</p> <p>c) Also deals with waste management, handling or collection, waste disposal, waste recycling, sanitation, etc.</p>
<p>Public Health Covid-19 General Regulations (as amended throughout 2020 to 2022)</p>	<p>a) Provides for a framework on how to deal with the challenges occasioned by the outbreak of the Covid-19 pandemics and includes issues related to restrictions on gathering, testing, contact tracing, quarantine facilities, public transport, sanitation at the work place, etc.</p> <p>b) It also provides for burial protocols to be followed for those who succumbed to the pandemic.</p>
<p>Social Security Act Act 34 of 1994 Employees' Compensation Act (as amended)</p>	<p>a) Compels employers and employees to make equal contributions to the Social Security Fund. Contribution is based on 0.9% of an employee's basic earnings with a minimum of N\$2.70 and a maximum of N\$81.00</p> <p>b) Requires employers to contribute to an insurance fund which covers injuries and accidents on duties.</p>
<p>Hazardous Substances Ordinance (No. 14 of 1974)</p>	<p>a) Provides for the control of hazardous substances with potential to cause harm, injuries and even death.</p> <p>b) Also provides for the manufacture, handling, storage, sale, use, disposal, etc. of hazardous substances.</p>
<p>Atmospheric Pollution Prevention Ordinance (No. 11 of 1976)</p>	<p>a) Provides control of noxious or offensive gases and matters incidental thereto.</p> <p>b) Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.</p>
<p>Water Resource Management Act (2004)</p>	<p>The following permits are required in terms of the Water Act:</p> <ul style="list-style-type: none"> o water abstraction permits; o domestic effluent discharge permits (site offices, construction camp); industrial effluent discharge permits; o water use for dust suppression; and water reticulation permits (pipelines). <p>Will be superseded by Water Resources Management Act 2013 once the regulations are implemented in the future.</p>
<p>National Heritage Act No. 27 of 2004</p>	<p>No archaeological/heritage site or cultural remains may be removed, damaged, altered or excavated.</p> <ul style="list-style-type: none"> ▪ Section 48 sets out the procedure for application and granting of permits, such as the permit required in the event of damage to a protected site occurring as an inevitable result of development. Section 51 (3) sets out the requirements for impact assessment. ▪ Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council
<p>Namibia Standard Act (Act No. 18 of 2005)</p>	<p>Responsible for the promotion of standardization and quality assurance in the industry, commerce and the public sector in Namibia, with the aim of improving product quality, industrial efficiency and productivity and promoting trade so as to achieve optimum benefit for the people of Namibia.</p>
<p>National Development Plans (NDP5)</p>	<p>NDP5 has its goal to reduce poverty such that by 2022, marginalized communities are integrated into the mainstream economy.</p>
<p>Harambee Prosperity Plan (HPP)</p>	<p>A government plan that is intended to prioritize the implementation of policy Programme that enhance service delivery, contribute to economic recovery and promotes economic growth</p>

6 IMPACT ASSESSMENT

6.1 INTRODUCTION

This section focuses on the potential environmental impacts that could be caused by the proposed development – construction and operation of a bulk liquid fuel storage and handling facility.

An ‘impact’ refers to the change to the environment resulting from an environmental aspect (or activity), whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity. From a qualitative perspective, impacts were identified as follows:

- ✚ impacts associated with listed activities, in this case the proposed facility;
- ✚ An assessment of the project activities, and
- ✚ Issues highlighted by stakeholders.

6.2 IMPACT ASSESSMENT METHODOLOGY

The standard methodology used in the environments impact assessment (EIA) to determine the significance rating of the potential impacts is outlined in this section.

6.3 SIGNIFICANCE

The **significance** of an impact is defined as the combination of the consequence of the impact occurring and the probability that the impact will occur. The nature and type of impact may be direct or indirect and may also be positive or negative. Refer to **Table 6** for the specific definitions.

Table 7: Nature of Impact

Impact	Nature and Type of Impact	
	Direct	Impacts that are caused directly by the activity and generally occur at the same time and place as the activity
	Indirect	Indirect or induced changes that may occur because of the activity. These include all impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.
	Cumulative	Those impacts associated with the activity which add to, or interact synergistically with existing impacts of past or existing activities, and include direct or indirect impacts which accumulate over time and space
	Positive	Impacts affect the environment in such a way that natural, cultural and /or social functions and processes will benefit significantly, and includes neutral impacts (those that are not considered to be negative)
	Negative	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will be comprised

Table 8 presents the defined criteria used to determine the consequence of the impact occurring which incorporates the extent, duration and intensity (severity) of the impact

Table 8: Impact Consequence

Consequence	Extent of Impact	
	Site Specific	Impact is limited to the site and immediate surroundings, within the study site boundary or property (immobile impacts).
	Beyond Site	Impact extends across the site boundary to adjacent properties (mobile impacts).
	Local	Impact occurs within a 5 km radius of the site.
	Regional	Impact occurs within a regional boundaries.
	National	Impact occurs across one or more national or regional boundaries.
	Duration of Impact	
	Incidental	The impact will cease almost immediately (within weeks) if the activity is stopped, or may occur during isolated or sporadic incidences
	Short term	The impact is limited to the construction phase, or the impact will cease within 1-2 years if the activity is stopped.
	Medium term	The impact will cease within 5 years if the activity is stopped
	Long term	The impact will cease after the operational life of the activity, either by natural processes or by human intervention
	Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient
	Intensity or Severity of Impact	
	Low	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are not affected.
	Low-medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are modified insignificantly.
	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are altered.
Medium-high	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are severely altered.	
High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will permanently cease.	

The probability of the impact occurring is the likelihood of the impacts actually occurring, is determined based on the classification provided in **Table 9**.

Table 9: Probability of Potential Impact Occurring

Probability	Probability of Potential Impact Occurrence	
	Improbable	The possibility of the impact materialising is very low either because of design or historic experience.
	Possible	The possibility of the impact materialising is low either because of design or historic experience.
	Likely	There is a possibility that the impact will occur
	Highly Likely	There is a distinct possibility that the impact will occur
	Definite	The impact will occur regardless of any prevention measures

The significance of the impact is determined by considering the consequence and probability without taking into account any mitigation or management measures, and is then ranked according to the ratings listed in **Table 10**.

Table 10: Significance Rating of Impact

Significance	Significance Rating	
	None	There is no impact at all - not even a very low impact on a party or system.
	Low	Neither environmental nor social and cultural receptors will be adversely affected by the impact. Management measures are usually not provided for low impacts.
	Low-medium	Management measures are usually encouraged to ensure that the impacts remain of Low-Medium significance. Management measures may be proposed to ensure that the significance ranking remains low-medium
	Medium	Natural, cultural and/or social functions and processes are altered by the activities, and management measures must be provided to reduce the significance rating
	Medium-High	Natural, cultural and/or social functions and processes are altered significantly by the activities, although management measures may still be feasible
High	Natural, cultural, and/or social functions and processes are adversely affected by the activities. The precautionary approach will be adopted for all high significant impacts and all possible measures must be taken to reduce the impact	

The **level of confidence** associated with the impact prediction is also considered as low, medium or high and is described in Table 11.

Table 11: Confidence Probability

Confidence	Probability of Potential Impact Occurrence	
	Low	Less than 40% sure of impact prediction due to gaps in specialist knowledge and/or availability of information.
	Medium	Between 40 and 70% sure of impact prediction due to limited specialist knowledge and/or availability of information.
	High	Greater than 70% sure of impact prediction due to outcome of specialist knowledge and/or availability of information

Once significance rating has been determined for each impact, management and mitigation measures must be determined for all impacts that have a significance ranking of medium and higher in order to attempt to reduce the level of significance that the impact may reflect. Based on the proposed mitigation measures, a mitigation efficiency is determined (**Table 12**), whereby the initial significance is re-evaluated and ranked again to effect a significance that incorporates the mitigation based on its effectiveness. The overall significance is then re-ranked, a final significance rating is determined.

Table 12: Mitigation Efficiency

Mitigation Efficiency	Mitigation Efficiency	
	None	Not applicable
	Very Low	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact. Positive impacts will remain the same
	Low	Where the significance rating reduces by one level, after mitigation
	Medium	Where the significance rating reduces by two levels, after mitigation
	High	Where the significance rating reduces by three levels, after mitigation
	Very High	Where the significance rating reduces by more than three levels, after mitigation

The reversibility is directly proportional to the “loss of resource” where no loss of resource is experienced, the impact is completely reversible; where a substantial “loss of resource” is experienced there is a medium degree of reversibility; and an irreversible impact relates to a complete loss of resources, i.e. irreplaceable. These are amplified further in **Table 13**.

Table 13: Degree of Reversibility and Loss of Resource

DEGREE OF REVERSIBILITY & LOSS OF RESOURCE	Loss of Resources	
	No Loss	No loss of social, cultural and/or ecological resource(s) are experienced. Positive impacts will not experience resource loss
	Minimal	The activity results in an insignificant or partial loss of social, cultural and/or ecological resource(s)
	Partial	The activity results in a significant loss of social, cultural and/or ecological resource(s)
	Irreplaceable	The activity results in the complete and irreplaceable social, cultural and/or ecological loss of resource(s)
	Reversibility	
	Incidental	Impacts on natural, cultural and/or social functions and processes are irreversible to the pre-impacted state in such a way that the application of resources will not cause any degree of reversibility
	Medium Degree	Impacts on natural, cultural and/or social functions and processes are partially reversible to the pre-impacted state if less than 50% resources are applied
	High Degree	Impacts on natural, cultural and/or social functions and processes are partially reversible to the pre-impacted state if more than 50% resources are applied
	Reversible	Impacts on natural, cultural and/or social functions and processes are fully reversible to the pre-impacted state if adequate resources are applied

6.4 CUMULATIVE IMPACTS

It is important to assess the natural environment using a systems approach that considers the cumulative impact of various actions. Cumulative impact refers to the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions. Cumulative impacts can result from individually minor, but collectively significant actions or activities taking place over a period. Cumulative effects can take place frequently and over a period that the effects cannot be assimilated by the environment

7 QUALITATIVE DISCUSSION OF IMPACTS

The activity entails the following:

The development of a bulk liquid fuel storage and handling facility on 5 500 m² of industrial land in the town of Walvis Bay. The facility will occupy a footprint of 3 330 m² of that land or 60%

The development has a jetty of approximately 60 m by 12 m wide extending onto the ocean water.

The facility will handle a single fuel product – automotive diesel fuel and will have designed capacity is 24 000 m³.

7.1 IMPACTS TRIGGERED BY THE LISTED ACTIVITIES

Potential impacts triggered by the proposed activity are presented in **Table 14** below.

Table 14: Impacts Triggered by the Proposed Activity

Activity Category	Expansion of Listed	Potential Impact Overview
Energy Generation, Transmission and Storage Activities	<p>Paragraph 1(c)</p> <p>The construction of facilities for refining of gas, oil and petroleum products.</p>	<ul style="list-style-type: none"> • Disturbance and or loss of marine habitat • Potential disruption of marine traffic • Disturbance of seafloor due to dredging and piling leading increased suspended sedimentation and dredged hazardous waste • Potential contamination of ocean water • Potential release of H₂S and CH₄ • Increased noise levels in the locality • Dust during demolition • Waste (hazardous and non-hazardous) • Increased traffic around the project site • Visual intrusion from lighting & equipment
Waste Management, Treatment, Handling and Disposal Activities	<p>Paragraph 2.1</p> <p>Disposal of waste</p> <p>Paragraph 2.2</p> <p>Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976</p> <p>Paragraph 2.3</p> <p>Temporary storage of waste generated during demolition, construction and maintenance activities.</p> <p>Handling of waste, both non-hazardous and hazardous during the operational phase of the facility.</p>	<ul style="list-style-type: none"> • Some of the above impacts
Water Resources and Development	<p>Paragraph 8.10</p> <p>Reclamation of land from below or above the high-water mark of the sea or associated inland water.</p> <p>(Project likely to involve some dredging to reclaim land for the jetty)</p>	<p>Some dredging and piling will be required:</p> <ul style="list-style-type: none"> • Some of the above listed impacts
Hazardous Substance Treatment, Handling and Storage	<p>Paragraph 9.2</p> <p>Any process or activity which requires a permit, licence or other form of authorisation, or the modification of changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit.</p> <p>Paragraph 9.3</p> <p>The bulk transportation of dangerous goods using pipeline, funiculars or conveyors with a throughout capacity of 50 tons or 50 cubic meters or more per day.</p> <p>Paragraph 9.4</p>	<ul style="list-style-type: none"> • Some of the above impacts

Activity Category	Expansion of Listed	Potential Impact Overview
	<p>The storage and handling of dangerous goods, including diesel, petrol, liquid petroleum, gas or paraffin, in containers with a capacity of more than 30 m³ at any one location.</p> <p>Temporary storage of hazardous products during the construction phase, e.g. fuel storage for use by construction vehicles.</p> <p>Paragraph 9.5</p> <p>Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid, petroleum, gas or paraffin</p>	
Infrastructure	<p>Paragraph 10.1 (a) The construction of oil, water, gas or other bulk supply pipelines to the proposed development.</p> <p>Paragraph 10.1 (e) The construction of any structure below any high water mark of the sea.</p>	<ul style="list-style-type: none"> Some of the above impacts

7.2 ENVIRONMENTAL ACTIVITIES

To understand the impacts related to the project, it is necessary to unpack the project activities associated with the project as well as high-level environmental activities undertaken in the various project phases as presented in **Table 15**.

Table 15: Environmental Activities

Pre-construction	Project Activities
	Detailed working drawings of the facility
	Approval of drawings of the facility by WBM
	Procurement – tendering, appointment of principal contractor, etc.
	Procurement of items with long lead-times, i.e. storage tanks, etc.
	<p>Environmental Activities:</p> <ul style="list-style-type: none"> EIA successful conducted and ECC obtained. Appointment of an Environmental Control Officer.
Construction	Project Activities
	Successful contractor mobilises resources and equipment to get to the project:
	<ul style="list-style-type: none"> Sets up a campsite with a site office and administrative facilities; Sets up ablution facilities (toilets, shower, change houses, etc.); Erects an information board at the site; Sets up access control, security, lighting, signage, etc. Mobilises plant and equipment to the site; Hires employees to work on the project; Provides induction to all employees on the EMP
	Contractor starts with activities on site:
	<ul style="list-style-type: none"> Demolition of the wooden jetty; Demolition of redundant building structures on site; Removal of debris from the site; Site clearing and preparation for layout for tank farm.
	Sourcing and procurement of construction materials and equipment:
	<ul style="list-style-type: none"> All bulk materials (sand, aggregate, etc.) - procure from local suppliers whose are ECC compliant; No mining of sand or aggregate by the successful contractor is allowed; Excavation and earthwork; Removal of existing surfacing where applicable, i.e. concrete, pavings, etc. Trenching and excavation to place below ground equipment – cables, sumps, pipes, etc.) Levelling and compaction using heavy machinery & equipment; Dredging work and disposal of dredged material; Piling;

	<ul style="list-style-type: none"> ✚ Construction of the concrete jetty to replace wooden jetty; ✚ Installation of tank farm equipment and accessories;
Operation	Project Activities
	Operations of the tank farm;
	Maintenance of equipment & infrastructure;
	Environmental Activities: <ul style="list-style-type: none"> ✚ Diligent compliance of the EMP; ✚ Compliance with other relevant permits (Fitness Certificate, etc.); ✚ Training of employees on the EMP; ✚ Effective solid waste handling & disposal; ✚ Effective handling of spill ✚ Effective handling and disposal of hazardous substances, and ✚ Maintaining a high standard of housekeeping.

7.3 ENVIRONMENTAL ASPECTS

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impact. The following environmental aspects have been identified for the proposed development which are linked to the project activities (note that only high-level aspects are provided in **Table 16**).

Table 16: Environmental Aspects

Pre-construction	Aspects
	Inadequate consultation with neighbouring factories /properties owners;
	Poor construction site planning and layout;
	Inadequate environmental and compliance monitoring;
	Inadequate design of tank farm and infrastructure;
	Absence of relevant permits;
Lack of barricading of sensitive environmental features;	
Construction	Aspects
	Poor handling of hazardous waste (dredged material);
	Absence of ablution facilities;
	Inadequate consultation and communication with IAPs
	Not utilising local labour;
	Inadequate environmental and compliance monitoring;
	Neglect to provide an induction workshop on the EMP;
	Contractor cutting corners – poor work execution,
	Lack of environmental awareness creation,
Poor site management, etc.	
Operation	Aspects
	Inadequate or poor communication and consultation of IAPs;
	Not utilising local labour
	Neglect to comply with provisions of the EMP;
	Inadequate oil spill response;
	Inadequate fire response;
	Lack of environmental awareness creation;
	Lack of maintenance to the facility and accessories;
	Inadequate management of waste and waste water;
Water conservation re-use activities not implemented, etc.	

7.4 QUANTITATE IMPACT ASSESSMENT

A quantitate assessment of identified impacts that are associated with the construction and operational phases and the significance ranking (WOM = Without Mitigation) is presented. Impacts for each alternative (both layout and treatment alternatives) are also provided. Brief management measures have been provided for the purposes of assessing whether the implementation of recommended management measures may be sufficient to decrease the significance ranking (WM = With Mitigation). Detailed impact assessment are presented in Tables 17, 18 & 19.

7.4.1 PRE-CONSTRUCTION IMPACT ASSESSMENT

Table 17: Assessment of Impacts Related to the Planning and Design Phase

PLANNING AND DESIGN PHASE		
Management measures to be considered during the planning and design phase have been provided with respect to compliance requirements, design consideration, decarbonisation, marine biodiversity around the jetty terminal, and visual (lighting of the facility).		
Aspect	Environmental Objectives	Management Action/Mitigation
Preliminary		
Compliance Requirements	Ensure that all the necessary permits and licenses are obtained in a timely manner.	<p>Ensure that all activities pertaining to the development are compliant with applicable laws and regulations and that all the necessary licenses and permits are secured and in place before construction work commences.</p> <p>Copies to be kept on file at the construction site office. e.g.</p> <ul style="list-style-type: none"> ✚ a valid ECC from MEFT; ✚ a Wholesale Licence from MME; ✚ Facility drawing plans checked and approved by the municipality; ✚ Employment contractors signed by both parties and copies kept on file
Design Consideration	Professional drawings (including working drawings) to be compliant with local authority standards and specifications.	<ul style="list-style-type: none"> ✚ The design for the bulk fuel storage and handling facility and support infrastructure must be prepared by professional engineers who are well experienced and registered with the Engineering Council of Namibia or equivalent foreign recognised body. ✚ The fuel storage tanks and conveying pipelines from the jetty terminal to tank farm must meet local or international standards and specifications. ✚ The design and layout which result in the least environmental disturbances must be selected and implemented. ✚ All building infrastructure must meet local authority requirements and approved by the Walvis Bay municipality.
Decarbonisation Initiative	Strive to limit the carbon footprint of the facility.	<ul style="list-style-type: none"> ✚ During the planning stage, efforts should be made aimed at embracing decarbonisation initiatives both during the construction and operational phases of the facility. ✚ The position and orientation of roof structure covering the facility should allow for maximum utilisation of solar panels. ✚ Green technology should be adopted when selecting equipment for the facility with emphasis given on the use of hybrid systems or those systems that can be powered by wind/solar energy. ✚ Where possible, procure and install water recycling facilities including solar geysers instead of conversional geysers. ✚ Design the facility in a manner that provides adequate day natural lighting and uses energy saving bulbs.
Marine Biodiversity around the Jetty Terminal		
Disturbance of seafloor during dredging and piling activities.	Ensure that minimal disturbance occurs during the construction and operation phases of the facility.	<ul style="list-style-type: none"> ✚ Dredging and piling activities that may be required for the jetty terminal and access channel route must be well planned, selection of dredging equipment which results in minimal environmental disturbance should be given preference. ✚ Once estimated volumes of dredged material has been ascertained, Namport should be consulted for offshore disposal. Duration for dredging activities must be communicated to relevant neighbouring factories to ensure that the operation results in minimal marine traffic. ✚ Dredging and piling must be carried out with the least impact and disturbances to marine biodiversity around the jetty terminal and by extension to the entire harbour. ✚ Ensure that activities (dredging and piling) is confined within the geographical boundary of the jetty terminal. Routine jetty terminal dredging maintenance intervals must be determined during the planning stage. ✚ Dredging and piling activities (construction) and delivery of fuel to the jetty terminal (operational phase) must be conducted with minimal disruptions to the marine traffic around the harbour.
Visual Impacts (Facility Lighting)		
Lighting and dust from demolition of redundant building structures	Ensure that lighting at the facility does not result in negative impacts	<ul style="list-style-type: none"> ✚ Ensure that the layout of the lighting at the facility, its extent and intensity do not become a nuisance to the neighbouring properties or a safety hazard to birds that fly at night, i.e. such as flamingos. ✚ Demolition of the wooden jetty and redundant building structures on the premises must be carried out in a manner that ensures minimal dust being blown up into the atmosphere.

		<ul style="list-style-type: none"> ✚ Stockpiles of building sand must be sited where minimal exposure to wind erosion occurs. Mixing of cement must be avoided during windy conditions. ✚ External walls and roofs of support building structures for the facility should be painted with colours that blend in well with the natural environment.
Heritage and Cultural Resources		
Archaeological Aspects	Protect items of cultural and heritage nature	<ul style="list-style-type: none"> ✚ The project is a brownfield, i.e. the site is in the industrial section of the harbour and has been fully developed and completely transformed. ✚ The chances of finding items of cultural or heritage nature during the construction and operation are therefore slim, if not zero. ✚ The EMP should be consulted in the event such items are uncovered.

7.4.2 ASSESSMENT OF CONSTRUCTION INDUCED IMPACTS

The construction entails the development of a 24 million litres bulk liquid fuel storage and handling facility with a footprint of 3 330 m² in the industrial coastal town of Walvis Bay.

<p>CONSTRUCTION PHASE:</p> <p>The construction phase entails the development of a bulk liquid fuel storage and handling facility with a designed capacity to hold 24 million litres of fuel. The facility will be developed on land measuring 5 500 m² and will have a footprint of 3 330 m². The main construction activities will include:</p> <ul style="list-style-type: none"> • demolition of a wooden jetty, • some dredging to deepen and widen the entry channel to accommodate large ocean fuel tankers for product delivery, • replacing the wooden jetty with a reinforced concrete jetty erected on concrete piles, • demolition of existing building structures on the 5 500 m² land portion leased to the promoter, • loading and transporting of all debris to an approved landfill site • installation of 6 x storage tanks each with a storage capacity of 4 million litres • installation of pipelines from the jetty to the tank farm, pumps, fire hydrant, electrical wiring, solar panels, etc. • clearing the site of all building debris, • commissioning the facility, i.e. refueling of fishing boats, etc.
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Table 18: Assessment of Environmental Aspects for the Construction Phase

Impact Description				Management Measures			
Increased Suspended Sediments							
<p>Some dredging will be required to deepen the access passage so as to facilitate the berthing and maneuvering of ocean tankers delivering fuel to the jetty. Ocean tankers are relatively larger than fishing vessels for which the jetty was originally designed.</p> <p>While it is expected that sediments around factory jetties are prone to contamination due to factory operations and movements of fishing boats, dredging has the potential to disturb the seafloor and to stir up sediment leading to increased suspended sediment and possibly turbidity in the water column within the immediate area and down current from the source.</p> <p>Dredging has also the potential to crack open pockets of Hydrogen Sulphide (H₂S) or even methane (CH₄) – a highly flammable gas.</p> <p>Dredged material is likely to consist of lagoon sand, silts and clays.</p> <p>Piling is also an activity with the potential to stir up sediments leading to increased suspended sediment around the project site.</p>				<ul style="list-style-type: none"> ✚ Ensure that any dredging that may be required is preceded by careful planning including an accurate volume of the materials to be dredged. ✚ The section to be dredged must be clearly demarcated and the work performed by trained and experienced personnel. ✚ Suitable dredging equipment should be selected for the operation and operated by well trained and experienced operators. ✚ Dredging activities should be communicated to neighbouring factories well in advance and the operation coordinated in a manner that results in minimal disruptions to the marine traffic around the factories. ✚ Dredged material must be disposed of in a responsible manner. Alternative use for the dredged material should be considered 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Medium	Low	High	Minimal	Partial
Disturbance of Marine Habitat							
<p>Dredging and piling have the potential to disrupt marine habitats presently on and around the jetty platform. Direct loss of marine habitat will also occur during the demolition of the wooden jetty structures</p>				<ul style="list-style-type: none"> ✚ Any dredging activities that may be undertaken must be well planned and confined to the layout of the jetty terminal being constructed. 			

Impact Description				Management Measures			
<p>which is unavoidable regardless of any alternative taken. However, the extent of the impact is limited to the jetty footprint of approximately 720 m² (60 m long by 12 m wide) and therefore very small.</p> <p>Areas disturbed during the construction will start to stabilise after the construction finishes, and to some extent, the rock amours, walkways and open structures of the concrete jetty will attract some replacement habitats and organisms.</p> <p>Direct impact will also occur during the maintenance dredging of the jetty and associated structures, but such impact is expected to be very minor and of low significance</p>				<ul style="list-style-type: none"> ✦ Prior to demolishing the jetty, a physical inspection should be carried out to determine if there are birds nestling on any structure of the jetty and to have such birds moved to a safe location. ✦ Demolition of the wooden jetty should be performed without causing any harm to mammals such as seals that frequent the jetty structures. ✦ In the event of any beehives found on the jetty structure during demolition, all work must be stopped and officials from the Walvis Bay Municipality informed and invited to relocate the beehives. ✦ Ensure that the demolition of the wooden jetty is undertaken without causing any leaks or spills of hazardous products. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Very Low	High	Minimal	Partial
Water Impacts (Surface & Groundwater)							
<p>Construction activities such as dredging and concrete piling have the potential to contaminate the water column through the release of concrete or the suspension of contaminated dredged sediments.</p> <p>Incorrect handling of hazardous chemicals used during the construction activities could result in spills or leaks which could contaminate surface water</p>				<ul style="list-style-type: none"> ✦ Any dredging and concrete piling activities that may be required must be well planned and executed by competent people who are well trained and experienced. ✦ Hazardous products required for construction activities must be stored in a secured place with an impervious floor, correctly banded with access limited to key personnel. ✦ Spill control measures must be in place and personnel trained on how to respond in the event of a major spill occurring at the site. ✦ Correct procedures as recommended by the manufacturer of hazardous products should be followed when using such products. Ensure that the procedures followed in handling hazardous products are reviewed from time to time and remedial measures taken when warranted. <p>Management of Ablution Facilities:</p> <ul style="list-style-type: none"> ✦ Adequate ablution facilities are to be provided by the Contractor for the duration of construction phase. ✦ Ablution facilities must be erected within 50 m from all workplaces but within the development footprint; ✦ Toilets are to be secured to the ground and must have a closing mechanism; ✦ Toilet paper must be provided at these facilities and must be serviced once per week; ✦ The contractor must ensure that spillage does not occur when toilets are cleaned/serviced, and contents must be properly stored and disposed of properly; ✦ Discharge of waste into the environment and/or burial of waste are strictly prohibited; ✦ Sanitary arrangements must be to the satisfaction of the ECO, the local authorities and the applicable legal requirements. <p>Management of waste water</p> <ul style="list-style-type: none"> ✦ The contractor is to ensure that clean run-off water is diverted away from potentially contaminated areas of the construction site; ✦ Contaminated liquids and soil from the site must be disposed of at a permitted disposal site; ✦ Safe disposal certificates to be kept in the site file. <p>Management of workshop and equipment:</p> <ul style="list-style-type: none"> ✦ Maintenance of equipment and vehicles is not allowed at the construction site. Faulty equipment must be removed from site and repaired at a workshop. ✦ A designated vehicle wash bay must be put in place and must meet the following requirements: <ul style="list-style-type: none"> ○ Must have an impermeable surface. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> ○ Must have drainage measures in place to direct contaminated water towards the oil separator. ○ Quality of water to be tested prior to release. If not safe, then contaminated water must be disposed of as hazardous waste at a licensed waste disposal facility. Safe disposal certificates to be obtained from the final disposal facility. ✚ Emergency spill kit ✚ No washing of plant outside of designated wash bay. ✚ Drip trays will be provided for the stationary plant and for the "parked" plant. ✚ All vehicles and equipment will be kept in good working order and serviced regularly. ✚ Leaking equipment will be repaired immediately or removed from the site. <p>Management of Concrete Mixing:</p> <ul style="list-style-type: none"> ✚ Cement mixing to take place on an impervious surface (e.g. plastic or cement mixing pit). ✚ Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement. <p>Prevention of Spillages and Spill Management;</p> <ul style="list-style-type: none"> ✚ Drip trays must be placed under all vehicles when immobile for longer than 24 hours. ✚ Vehicles suspected of leaking must be monitored and a pre start-up inspection checklist at the beginning of each shift. ✚ Drip trays must be checked and replaced for vehicles standing (parked) for prolonged periods. ✚ Drip trays must be of a sufficient size and volume to collect any hydrocarbon leakages from a stationary vehicle. ✚ Spill kits (absorbent material) must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. ✚ Spilled substances must be contained in impermeable. <p>Stormwater Management:</p> <p>The following measures are recommended:</p> <ul style="list-style-type: none"> ✚ Compile and implement a proper stormwater management plan; ✚ Increased run-off during construction should be managed using berms, temporary cut-off drains, attenuation ponds or other suitable structures, in consultation with the ECO and Resident Engineer; ✚ Cut off drains may not cause additional harm to environment. Care must be taken to consider their position and the receiving environment; ✚ Stormwater management system is to be installed as soon as possible following site establishment, to attenuate stormwater during the construction phase, as well as during the operational phase; ✚ Surface-water run-off and stormwater must be directed away from trenches and areas of excavation. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	High	Minimal	Reversible
Atmospheric Emissions							
Dust emissions altering air quality and visibility on nearby roads.				✚ A speed limit of 20km/h must be maintained on all internal routes on the construction premises.			
Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.) altering air quality				✚ Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> ✦ All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; ✦ In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible. ✦ All vehicles used during the project should be properly maintained and in good working order. ✦ All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	Very High	None	Partial
Noise and Vibrations							
<p>The project site is in an industrial area in which ambient noise level is elevated due to fishing activities and movements of traffic to and from the port. Restriction with respect to working hours does not apply in the area.</p> <p>During the construction sources of noise will be construction machinery, vehicles and equipment. Demolition and dredging activities will also produce some noise but of short duration.</p> <p>Vibrations will come from demolition activities (braking old concrete foundation with jackhammers, piling of concrete support structures, etc.). During the construction, noise sources will be trucks collecting fuel from the facility, etc.</p>				<ul style="list-style-type: none"> ✦ Establish noise attenuation structures around high noise activities, e.g. metal fabrication activities, concrete mixers, etc. ✦ Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels. ✦ Construction activities should be limited to daytime only. ✦ When required noise mufflers should be utilised to reduced noise; ✦ It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. ✦ Construction vehicles must be well maintained and regularly serviced with defective silencers replaced. ✦ Employ noise reduction methods, i.e. no idling of construction vehicles, no unnecessary hooting, no loud music equipment on the premises, etc. ✦ Employees working in areas where noise levels are levated should be provided with suitable PPE. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	Low	None	Partial
Waste Generation, Handling & Disposal							
<p>Various waste types will be generated during the construction and operational phases of the facility. This will include hazardous waste associated with the handling of fuels, paints, thinners, chemicals, plastics, and possibly asbestos (during demolition of redundant building structures).</p> <p>Dredging activity is likely to generate some dredged sediments which is considered as hazardous waste and has to be handled and deposited as hazardous waste materials.</p> <p>Poor waste management during the construction has the potential to lead to contamination of surface water, groundwater, visual nuisance, etc.</p> <p>Increased generation of domestic, construction and hazardous waste by the activity can put strain on service delivery by WBM.</p>				<ul style="list-style-type: none"> ✦ A waste management plan must be developed and implemented during the construction period. . ✦ Waste recycling should be encouraged. ✦ Domestic waste must be stored in containers labelled or colour coded for general waste. ✦ Vermin / weatherproof bins should be provided in sufficient numbers and capacity to store domestic waste. ✦ Containers must be emptied frequently before reaching safe holding capacity. ✦ Solid waste shall only be stored in the designated general waste storage area which must be enclosed and impermeable. ✦ No waste shall be buried or burned anywhere on the construction site. ✦ All solid waste shall be disposed of by a certified contractor, off-site, at the landfill site of WBM. The Contractor shall supply the ECO with a certificate of disposal for auditing purposes. ✦ Avoidance, reduction and reuse should be practiced wherever possible ✦ Waste may not cause any nuisance to employees or guests visiting the construction site, (e.g. odour). ✦ Records of waste manifest documents must be retained at the administration office. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> ✚ Construction waste must be collected and put into suitable closed bins on a daily basis. ✚ Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away. ✚ Construction rubble must be disposed of at a registered landfill site. ✚ Temporary storage of waste is allowed (once of storage of waste for a period not exceeding 60 days. The volume of material should be limited to less than 30 m² of hazardous waste. Written permission should be obtained from WBM if this period has to be exceeded. ✚ Records of waste manifest documents must be retained at the administration office. ✚ Certificates of registration must be retained for transporters of hazardous waste and retained in record at the site office. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	Low	Partial	Partial
Traffic Impacts – Marine and Land based							
<p>Ocean tankers delivering fuel to the terminal taking too long to turn into the terminal, has the potential to lead to congestion of marine traffic around the harbour.</p> <p>Fishing boats lining up at the jetty terminal to refuel leading to congestion of marine traffic. at the terminal. round the factories . During the construction, there will be construction machinery and vehicles around the project site delivering construction materials, i.e. sand, concrete stones, cement, etc. Traffic flow around the project site will increase possibly leading to congestion.</p> <p>In the event that traffic problems are encountered during the operational phase of the facility, a combined initiative from all factories around the facility should be conducted to determine how best to improve traffic movements around the project site. The initiative should include the transport and traffic depart of the Municipality of Walvis Bay</p>				<ul style="list-style-type: none"> ✚ Ensure that fuel delivery to the terminal is well planned and well-coordinated with scheduling communicated to neighbouring stakeholders well in advance without causing delays or congestion to marine traffic around the harbour. ✚ Any complainants received from any stakeholder with respect to delays or congestion must be recorded, investigated and corrective measures taken. ✚ All construction machinery and vehicles must have their headlights switched on at all times. ✚ Clear signage with respect to access point and entry point to the facility should be clearly displayed. ✚ No trucks making deliveries to the facility should be parked on the street roads for extended period of time obstructing entrances to neighbouring properties. ✚ All vehicles of the contractor used in construction activities and operated on public roads must be licensed, roadworthy and driven by operators with valid drivers and third party public licence permits. ✚ All drivers must be given an induction training workshop on the EMP. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Medium	Low	Very High	None	No
Impacts on the Ecosystem and Marine Biodiversity							
<p>The project site is on land which is completely developed and its ecosystem completely transformed.</p> <p>Impacts on biodiversity are limited to marine faunal species - seals and some bird species that have made the jetty structures their habitats.</p> <p>The demolition of the wooden jetty will present a habitat loss albeit temporarily.</p> <p>The bright light installed on the facility has the potential to impact on the birds flying at night causing disorientation and even collision. Birds such as flamingos that fly at night can be blinded by light.</p> <p>Dredging and piling are noisy activities and will have some negative impacts on marine mammals, but minimal and of short duration.</p> <p>Chemical spills and/or leaks can wash into the ocean causing contamination of the water quality and impacting on the biodiversity.</p>				<ul style="list-style-type: none"> ✚ Ensure that machines are well maintained, routinely serviced and operated by operators who are well trained and inducted on the EMP. ✚ Any dredging and piling that may be required must be well planned and executed in a manner that results in minimal disturbances to the marine biodiversity. ✚ Where possible soundproof all machinery known to cause disturbances and ensure that a high standard of maintenance is provided. ✚ Develop an Emergence Response Plan (ERP) to deal with any spills or a major leak which occurs at the facility. ✚ Outside lights must be directed downwards to working surfaces and not outwards. ✚ Discourage nesting by birds on manmade structures on the premises. ✚ Maintain a high standard of housekeeping which provides for effective implementation of the EMP including mitigation measures related to waste handling, prevention of groundwater & surface water contamination and elimination of impacts on the ecosystem and biodiversity. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> Waste with potential to attract scavengers to the facility must be kept in lockable containers. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	Low	Partial	Partial
Aspects Related to Health, Safety & Security							
<p>The core activities of the facility is storage and handling of bulk liquid fuel products which are classified as hazardous products. Such products are handled by people who are exposed to health and safety risks during all phases of the project – construction, operation and maintenance.</p> <p>Handling of hazardous chemicals poses the main risks to employees and members of public who may be visiting the premises where the facility is situated. Fire is also a serious risk which can arise especially when flammable chemicals are poorly stored and or handled.</p> <p>During the construction period - building structures to be dismantled contain asbestos which can pose a significant health risk.</p> <p>During the operational phase - spilling or leaks of hazardous products on the jetty could result in contamination of seawater with negative impacts to the marine biodiversity.</p>				<ul style="list-style-type: none"> The promoter must develop a health and , safety and security management system for the facility which includes motoring and mitigation tools. The plan must include emergency preparedness plan to deal with any spills and or leaks of chemicals that may occur during the operation of the facility. All chemicals must be stored and handled according MSDS instructions. It is a requirement to comply with all health and safety standards as specified in the Labour Act and related Legislation. Dangerous and restricted areas, machinery and or equipment must be clearly labeled. Employees working with hazardous products should be provided with suitable PPE. Provide 24-hour access control to the site with 24/7 security. Workers found to be engaging in activities such as excessive consumption of alcohol, drug use or selling of any such items on site must be disciplined. No firearms are allowed on the construction site unless used by security personnel. A selected employees should be trained on how to provide first aid in the event of an accident/incident and a first aid. First aid kits that are adequately stocked should be available. A maintenance registry of all equipment whose malfunction can lead to injury or exposure to hazardous substances should be kept. Apply and adhere to all industry specific health and safety procedures and regulations applicable to the fuel sector. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	Very High	None	Partial
Incidents, Accidents and Potential Emergency Situations							
Pollution Incident at the construction site				<ul style="list-style-type: none"> Proper emergency response procedure to be in place to deal with any spill or leaks at the construction site. Ensure that the necessary materials and equipment to deal with spills and leaks are available on site, where practicable. Remediation of the spill areas will be undertaken to the satisfaction of the Site Manager and ECO. In the event of a hydrocarbon spill, the source of the spillage must be isolated and contained. The area will be cordoned off and secured; All staff on site to be made aware of actions to be taken in case of a spillage; Ensure that contact details of person to be notified in a case of spillages is provided. Adequate signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers) 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	-
Health and safety incidents, i.e. injury to workers.				<ul style="list-style-type: none"> Contractor to prepare a Health and Safety Plan for the construction site and a Safety Agent. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> ✚ All construction personal must be clearly identifiable. All employees must also be issued with employee cards for identification purposes. ✚ All workers will be supplied with the required Personal Protective Equipment (PPE). ✚ Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards will be indicated suitably (e.g. reflectors, lighting, traffic signage); ✚ Maintain access control to prevent access of the public to the construction areas, as far as practicable; ✚ 24-hour security and access control; ✚ Offer Health and Safety awareness training; 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	Partial
Spillage and accidents and injuries caused by poor or inappropriate storage of hydrocarbons or other hazardous material				<ul style="list-style-type: none"> ✚ Storage requirements for hazardous chemical substances (HCS) to be determined based on chemical qualities of material and Safety Data Sheets (SDS). ✚ As a minimum, HCS must be stored at a designated area that meets the following requirements: <ul style="list-style-type: none"> ○ Earthed; ○ Fire extinguisher must be present; ○ Relevant signage to be displayed including No Smoking/ No open flames; Hazardous Chemical Substance Store; Type of HCS (e.g. Diesel); Maximum contents volume and Fire extinguisher' ○ Storage areas should be located 100m from the edge of wetlands; ✚ Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards. ✚ Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided. ✚ All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material. ✚ Spillages: <ul style="list-style-type: none"> ○ In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented. ○ The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present; ○ The ECO and Project Manager must be notified of all significant spillage 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	Yes	Irreversible
Fire and or explosions and resultant injury, death and damage to property.				<ul style="list-style-type: none"> ✚ Appropriate emergency response to be in place to deal with any potential fire that may arise at the construction site. ✚ All fire control mechanisms (firefighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services. ✚ All staff on site to be made aware of general fire prevention and control methods, and the name of the responsible person to alert in the event of fire occurring. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> ✚ Burning of waste is not permitted. ✚ Suitable precautions to be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment. ✚ Designated smoking areas should be provided, with special bins for discarding of cigarette butts. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	No	-ve	Medium-low	Low	High	Yes	No
Fire Hazardous Impacts							
<p>Chemicals that will be procured for use during the construction of the facility could be flammable hence posing fire risks. Fire can result from incorrect handling of chemicals or incorrect storage of such chemicals, i.e. chemicals stored in contact with electrical equipment.</p> <p>The risk of fire erupting is ever present during the operation and maintenance of the facility. Vapours from fuel are dangerous. Fuel vapour are heavier than air and can flow along the ground without being detected because they invisible. Such vapour can ignite from a flame, spark, hot surface or static electricity causing a shattering explosion.</p> <p>The site is located next to built-up areas which increase the difficulty of fighting fires.</p>				<ul style="list-style-type: none"> ✚ A fire protection and prevention plan must be developed for the facility. In the plan provision must be for evacuation plans, fire escape routes, assemble point, signage, emergency response plan, etc. ✚ Ensure that personnel is trained on fire fighting, on what to do during a fire outbreak, correct use of fire extinguishers, etc. ✚ Ensure that regular inspections is carried out on electrical connections to mechanical equipment such as pumps and pipes for any leaks. ✚ Firefighting equipment must be regularly inspected for functionality and performance and well maintained. ✚ Any complainant received with respect to fire hazardous must be investigated and corrective measures taken. ✚ Smoking around the tank farm should be had in designated areas only that are reserved for such purpose and clearly signposted 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	Very High	High	Partial
Visual Intrusion							
<p>Construction sites are often a hive of activities with movements of construction vehicles, machinery, equipment and overhead cranes. The site can therefore be a source of visual annoyance with scaffolding and cranes lifting construction materials often visible from a distance.</p> <p>The site is built up and served as a fish factory. The bulk of the structures are to be demolished which could lead to dust pollution with the potential to become a visual nuisance if recommended mitigation measures are not implemented.</p>				<ul style="list-style-type: none"> ✚ Position construction machinery and equipment and associated facilities in such a way that it is out of sight of human receptors using the street road. ✚ Use suitable screening during the construction to minimise visual impacts. ✚ Make use of dust suppression measures where possible, especially when demolishing building structures. or excavating during windy conditions. ✚ Specific activities that are prone to generating excessive dust should be suspended during high windy conditions or avoided altogether ✚ Direct security light inwards where it is required and where feasible make use of LED bulbs. ✚ Maintain a high standard of housekeeping with zero tolerance on littering. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Medium	Low	Very High	Not Applicable	Fully Reversible
Impacts of Utilities and Infrastructure							
<p>As mentioned elsewhere in this report, the project site is the industrial section of the town which is fully developed with multiple infrastructure on the premises. Some of such infrastructure is water pipeline, electricity, sewerage network, etc.</p> <p>There is therefore a strong possibility for such infrastructure to sustain damage during the construction activities. Any damage that maybe caused to any existing infrastructure on the premises or on the neighbouring properties as a result of the proposed activities should be rectified at the cost of the party responsible for causing such damage.</p>				<ul style="list-style-type: none"> ✚ Where construction vehicles are expected to cross buried pipelines, the necessary infrastructure should be in place to prevent any potential damage. ✚ Scour protection should be installed where necessary to protect the seabed from scouring and to prevent siltation of adjacent docking areas. ✚ All construction machinery and vehicles must have their headlights switched on at all times. ✚ Clear signage with respect to access point and entry point to the facility should be clearly displayed. 			

Impact Description				Management Measures			
Scouring of the seabed caused by fishing boat propellers has the potential to result in the accumulation of sedimentation leading to shallow water around the jetty.				<ul style="list-style-type: none"> ✦ No trucks making deliveries to the facility should be parked on the street roads for extended period of time obstructing entrances to neighbouring properties. ✦ All vehicles of the contractor used in construction activities and operated on public roads must be licensed, roadworthy and driven by operators with valid drivers and third party public licence permits. ✦ All drivers must be given an induction training workshop on the EMP. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Medium	Low-Medium	High	Partial	Reversible
Heritage and Cultural Resources							
<p>The site had been full developed and no heritage resources were identified on site. Historically, items of cultural and heritage interests have been found at localities along the coast, i.e. at the salt works about 10 km southeast of the project site.</p> <p>In the event of items of cultural or heritage found during the construction activities 'the chance find procedure' must be followed as per the EMP</p>				<ul style="list-style-type: none"> ✦ Protect items of cultural and heritage nature if found during earth excavation works. ✦ Proceed as outlined in the EMP. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	No	-ve	Low	Low	Very High	Partial	Reversible
Management of Resources							
<p>The project will use resources such as:</p> <ul style="list-style-type: none"> ✦ electricity, ✦ water, ✦ fuel, ✦ building construction materials, ✦ sanitation (toilet papers, soap, etc.). 				<p>Resources should be used sparing because they are scarce with several competing interests. These measures are recommended:</p> <p>Electricity:</p> <ul style="list-style-type: none"> ✦ Use electricity sparingly, ✦ Measure electricity consumption monthly, and ✦ consider the use of alternative energy such as solar power or wind. <p>Water:</p> <ul style="list-style-type: none"> ✦ Use electricity wisely; ✦ Enforce water saving strategies which include recycling and reuse; ✦ Measure water consumption and ensure that leaking taps are repaired. <p>Fuel:</p> <ul style="list-style-type: none"> ✦ Ensure fuel storage areas are secured and access strictly controlled. ✦ Reduce theft (increase security); ✦ Fuel leakages from equipment must repaired; ✦ Record procurement and consumption; ✦ Manage stockpiles effectively. <p>Building construction materials:</p> <ul style="list-style-type: none"> ✦ Increase security especially for cement and other construction materials; ✦ Monitor consumption; ✦ Guard against misuse; ✦ Maintain a high standard of housekeeping. <p>Sanitation:</p> <ul style="list-style-type: none"> ✦ Monitor consumption; ✦ Guard against misuse; ✦ Maintain a high standard of housekeeping. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	Very High	Yes	Partial
Socio-economic Impacts							
<p>Investment in the local economy: The project CapEx is in the order of N\$250 million.</p>				<ul style="list-style-type: none"> ✦ The investment is a major boost to the local economy in the sense that, during the construction phase, the bulk of the funds invested in the project will spent in the local economy for the procurement of building materials 			

Impact Description				Management Measures			
				(cement, building sand, building stones, etc.).			
				<ul style="list-style-type: none"> ✚ The national economy is also set to benefit from the project because import duties, PAYE taxes and VAT are all paid to the NamRa – the collector of state revenue. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	+ve	Medium	Medium	High	Not Applicable	Not Applicable
Creation of Employment Whilst the successful contractor is likely to have the core of its professional staff in fulltime employment, during the construction phase numerous job trade opportunities will become available which are often filled on a temporarily basis.				<ul style="list-style-type: none"> ✚ Ensure that building trade opportunities (plumbing, tiling, paving, bricklaying, joinery, etc.) that become available during the construction (skilled and non-skilled) are filled by SME companies or individuals drawn from the local town and or region. ✚ Ensure that employment is offered in a transparent manner without discrimination on the basis of colour, race, tribe, religion, gender or political affiliation. ✚ Employment of non-Namibians must be justified to the line ministry. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	+ve	Medium	Medium	High	Not Applicable	Reversible
Working conditions Provide a safe and hazardous-free working environment.				<ul style="list-style-type: none"> ✚ The successful contractor hired to develop the facility must provide good working conditions for employees with clear defined roles and responsibilities. ✚ Provide adequate ablution facilities with clean drinking water and sanitation facilities (soap, toilets, etc). ✚ Provide suitable PPE and comply with the labour laws and regulations. ✚ Poor labour relations could lead to industrial actions and strikes which ultimately attract unwanted attention in the media and social platforms. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	+ve	Medium	Medium	High	Not Applicable	Not Applicable
Transfer of skills and technology Provide an opportunity for the transfer of skills and technology in the critical oil sector to the locals, especially the youth who are entering the job markets.				<ul style="list-style-type: none"> ✚ The building of a fuel storage and handling facility is a sophisticated project requiring employees with specialist technical skills and experience for its installation and execution/operation. ✚ Ensure that skills development and training opportunities are offered to benefit employees of the contractors. ✚ New technologies are continuously being developed and implemented in the sector – employees should benefit from such technologies through training. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	+ve	Medium	Medium	High	Not Applicable	Not Applicable
Communication Keep and maintain good communication with stakeholders				<ul style="list-style-type: none"> ✚ Keep neighbouring factories informed of major project construction activities – demolition of redundant buildings, breakdown of the wooden jetty, dredging and piling etc. ✚ Ensure that a Project Information Board is procured and installed where it is clearly visible to the general public, prior to starting with construction activities. ✚ Ensure that construction site notice boards are prepared and erected at strategic locations around the construction site. Amongst the information that should be appear on the site notice is: <ul style="list-style-type: none"> ○ wearing of PPE at all times, ○ do not start work with an induction, ○ keep the site clean and tidy, ○ do not put yourself and others at risk, ○ follow safety signs and procedures, ○ never work in unsafe areas, ○ Report defects and near misses, and 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> ○ Never temper with equipment, etc. ✚ Good communication with stakeholders will ensure that misunderstanding are avoided leading to the successful completion of the project on time and within budget. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	+ve	Medium	Medium	High	Not Applicable	Not Applicable

7.4.3 ASSESSMENT OF OPERATIONAL INDUCED IMPACTS

OPERATIONAL PHASE:
<p>The operation phase will entail these activities:</p> <ul style="list-style-type: none"> • delivery of bulk fuel by ocean tanks docking at the new concrete, • pumping of the ocean tankers into the six storage tanks • refueling of fishing vessels from the storage tanks • loading of road tankers from the facility • day-to-day management of the facility (record keeping, cleaning, etc.) • maintenance of the facility, etc. • loading road tankers • destined

Table 19: Assessment of Environmental Activities – Operational Phase

Impact Description				Management Measures			
Water Impacts (Surface and Groundwater)							
Liquid waste including sewage has the potential to cause pollution to surface and groundwater sources, if not managed and disposed of correctly				<ul style="list-style-type: none"> • Provide adequate ablution facilities at the facility for the permanent staff and clients. • Ensure that an effective management system of the ablution facilities is implemented. • Ensure that waste water at the facility is managed effectively by ensuring that clean run-off water is diverted away from potentially contaminated areas. • Implement a safe disposal of liquid waste. • Comply with the waste and waste water management plan suggested in the EMP 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Medium	Low	High	Yes	Partial
Impacts from poor waste management (hazardous and non-hazardous) including spills and run-off from wash bays.				<ul style="list-style-type: none"> • Littering and contamination of water sources during operation must be prevented by effective waste and waste water management and prevention of spills. • Spill procedures must be in place in case of spillages onto street road surfaces, jetty structure, etc. • Implement approved method statements for managing of waste and waste water and removal. • Implement approved standard operating procedures for waste and waste water management; • Maintain tank farm and pipeline infrastructure in a good condition; • Maintain silt traps, sumps and oil separators as part of the stormwater management system. • A designated vehicle wash bay must be put in place and must have an impermeable surface, with a drainage system directing wastewater to an oil separator. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility

Impact Description				Management Measures			
Direct	Yes	-ve	Low	Low	High	Partial	Reversible
Dredging activities to maintain the terminal may lead to an increased suspended sediment around the jetty terminal.				<ul style="list-style-type: none"> Ensure that any dredging activities that may be required for the smooth operation of the jetty terminal are well planned and carefully executed with minimal impacts on the marine environment. Comply with the EMP. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	No	Yes
Atmospheric Emissions							
Emissions from vehicles and equipment (CO ₂ , NO _x , SO _x , VOC's etc.)				<ul style="list-style-type: none"> All vehicles and machinery to be regularly maintained so as to operate efficiently. Idling time of vehicles and machinery at the facility must be minimised. In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible. All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	Reversible
Point source emissions from the facility including SO ₂ ; PM ₁₀ ; NO ₂ and CO may alter air quality				<ul style="list-style-type: none"> Strive to make use of fuel with low sulphur content for company machinery, vehicles and equipment. Develop and maintain environmental management system for emission control. Monitor gaseous emissions on a yearly basis measuring these parameters: <ul style="list-style-type: none"> Particulate Matter (PM₁₀), Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), and Carbon monoxide (CO) 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	Reversible
Area source emissions including Volatile Organic Compounds (VOCs) from the whole site during operation may alter air quality and impact on surrounding properties.				<ul style="list-style-type: none"> Diesel tanks – should have a fixed dome roof with facility of nitrogen-inerting for vapour space. Vapour Recovery Unit (VRU) - A vapour recovery system to be included at the loading gantry to alleviate pressure differences while loading product. The vapour recovery shall extract vapour from the road tankers and re-liquefy through a compressor to pump back to the tanks. A vapour recovery system should be in place to recover vapours displaced during filling activities at the storage tanks as well as at the road tanker filling facilities. The VRU processes surplus vapours providing both an ecological and economic aspect of recovering products, with an average 1,5 litres/m³ of hydrocarbon vapours. All fuel transfer points will be serviced by vapour recovery units which must have a minimum efficiency of 95%. Emission testing should be conducted on a regular basis. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	Reversible

Impact Description				Management Measures			
Noise nuisance from the facility to surrounding properties				<ul style="list-style-type: none"> • Equipment and/or machinery which to be used at the facility must comply with the manufacture's specifications on acceptable noise levels. • When required noise mufflers should be utilised to reduced noise; • Employees working in areas where noise levels are above the threshold allowed, should be provided with suitable PPE. • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	Partial
Waste Generation, Handling & Disposal							
Increased generation of hazardous waste has the potential to put strain on existing disposal facilities.				<ul style="list-style-type: none"> • Ensure an effective safe disposal of waste from the facility. • Establish contract with external contractor(s) for removal of waste from the facility. • Appointed external contractor must have an approved Standard Operating Procedure for waste removal. • Handle waste and waste water management plan as per the EMP. • Encourage and put waste recycling practices in place at the facility. • Domestic waste must be stored in containers labelled or colour coded for general waste; • Vermin / weatherproof bins to be provided in sufficient numbers and capacity to store domestic waste. • Containers must be emptied frequently before reaching capacity. • Solid waste shall only be stored in the designated general waste storage area which must be enclosed and impermeable. • No waste shall be buried or burned anywhere on the site. • All solid waste shall be disposed of by a certified contractor, off-site, at WBM landfill. • Avoidance, reduction and reuse should be practiced wherever possible. • Waste may not cause any nuisance (e.g. odour). • Records of waste manifest documents must be retained at the administration office. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	Very High	Partial	Reversible
Increased generation of general waste by the activity has the potential to put strain on service delivery and available facilities .				<ul style="list-style-type: none"> • Ensure an efficient and safe disposal waste from the facility. • Put a valid contract with external contractor for the removal of waste in place. • Appointed waste contractor must have an approved Standard Operating Procedure for waste management implementation. • Implement a plan for waste and waste water management plan at the facility as per the EMP. • Promote and encourage waste recycling at the facility. • Domestic waste must to be stored in containers labelled or colour coded for general waste; • Vermin / weatherproof bins to be provided in sufficient numbers and capacity to store domestic waste. • Containers must be emptied frequently before reaching capacity. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> • Solid waste shall only be stored in the designated general waste storage area which must be enclosed and impermeable. • No waste shall be buried or burned anywhere on the site. • All solid waste shall be disposed of by a certified contractor, off-site, at an approved landfill site of municipality. • Avoidance, reduction and reuse should be practiced wherever possible. • Waste may not cause any nuisance (e.g. odour) • Records of waste manifest documents must be retained at the administration office. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	Partial	Reversible
Solid waste from operational activities may cause visual impacts if not managed and disposed of correctly				<ul style="list-style-type: none"> • Promote safe disposal of waste. • Put in place a valid contract with external contractor for removal of waste from the facility premises. • Appointed contractor must have an approved Standard Operating Procedure for waste management. • Comply with the waste and waste water management plan recommended in the EMP. • Promote a high standard of housekeeping at the facility. 			
Incidents, Accidents and Potential Emergency Situations							
Health and safety incidents e.g. injury to workers or visitors to the site.				<ul style="list-style-type: none"> • Provide suitable PPE to all employees and enforce wearing of such PPE at all times. • Adequate signage for safety, warning, caution and emergencies must be provided at all appropriate locations around the facility and must be clearly visible. • Furthermore, the contact details of all relevant management and applicable authorities must be displayed; • Storage and handling of fuels and chemicals on site must comply with the relevant method statements, safety data sheets, standard operating procedures and designs and approvals 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	None
Spills resulting from overfilling of the storage tanks at the tank farm				<ul style="list-style-type: none"> • Handling of fuels and chemicals on site must comply with the relevant method statements, safety data sheets and standard operating procedures. • Suitable tools and equipment must be provided and employees trained on how to use such equipment. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	Yes	Partial
Impacts caused by loss of containment of hazardous liquid materials from jetty to storage tanks, spillage into the ground or on surface or groundwater, (fires and explosions)				<ul style="list-style-type: none"> • Correct designs to relevant standards and codes as per best available technology. • Ensure that major hazard installation risk assessment is installed prior to construction of the construction of the terminal. • Comply with recommendation of the EMP. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility

Impact Description				Management Measures			
Direct	Yes	-ve	Low	Low	High		
Disturbances on the Ecosystem and Marine Biodiversity							
<p>The project site is on land which is completely developed and its ecosystem completely transformed.</p> <p>The bright light installed on the facility has the potential to impact on the birds flying at night causing disorientation and even collision. Birds such as flamingos that fly at night can be blinded by light.</p> <p>Dredging for maintenance purposes must be well planned and neighbouring prertie informed and piling are noisy activities and will have some negative impacts on marine mammals, but minimal and of short duration.</p> <p>Chemical spills and/or leaks can wash into the ocean causing contamination of the water quality and impacting on the biodiversity.</p>				<ul style="list-style-type: none"> • Ensure that machines are well maintained, routinely serviced and operated by operators who are well trained and inducted on the EMP. • Any dredging and piling that may be required must be well planned and executed in a manner that results in minimal disturbances to the marine biodiversity. • Where possible soundproof all machinery known to cause disturbances and ensure that a high standard of maintenance is provided. • Develop an Emergence Response Plan (ERP) to deal with any spills or a major leak which occurs at the facility. • Outside lights must be directed downwards to working surfaces and not outwards. • Discourage nesting by birds on manmade structures on the premises. • Maintain a high standard of housekeeping which provides for effective implementation of the EMP including mitigation measures related to waste handling, prevention of groundwater & surface water contamination and elimination of impacts on the ecosystem and biodiversity. • Waste with potential to attract scavengers to the facility must be kept in lockable containers. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	Yes	Reversible
Health, Safety & Security							
<p>The core activities of the facility is storage and handling of bulk liquid fuel products which are classified as hazardous products. Such products are handled by people who are exposed to health and safety risks during the operation and maintenance activities.</p> <p>Handling of hazardous chemicals poses the main risks to employees and members of public who may be visiting the premises where the facility is situated. Fire is also a serious risk which can arise especially when flammable chemicals are poorly stored and or handled.</p> <p>During the operational phase - spilling or leaks of hazardous products on the jetty could result in contamination of seawater with negative impacts to the marine biodiversity.</p>				<ul style="list-style-type: none"> • The promoter must develop a health, safety and security management system for the facility which includes motoring and mitigation tools. • The plan must include emergency preparedness plan to deal with any spills and or leaks of chemicals that may occur during the operation of the facility. • All chemicals must be stored and handled according MSDS instructions. • It is a requirement to comply with all health and safety standards as specified in the Labour Act and related Legislation. • Dangerous and restricted areas, machinery and or equipment must be clearly labeled. • Employees working with hazardous products should be provided with suitable PPE. • All personnel should receive adequate training on the operational procedure of equipment and machinery and the handling of chemical and hazardous products. • A selected employees should be trained on how to provide first aid in the event of an accident/incident and a first aid. First aid kits that are adequately stocked should be available. • A maintenance registry of all equipment whose malfunction can lead to injury or exposure to hazardous substances should be kept. • Apply and adhere to all industry specific health and safety procedures and regulations applicable to the fuel sector. 			
Noise and Vibrations							
<p>During the operation phase, noise will be generated by road tankers visiting the facility to collect fuel for delivery to retailers.</p> <p>Refueling of boats is not expected to generate noise of significance.</p>				<ul style="list-style-type: none"> • Establish noise level threshold consistent with World Health Organisation (WHO) guidelines and comply accordingly. • The facility is located in the industrial area of Walvis Bay where restrictions with respect to working hours do not apply. • Set speed limit for vehicles operated on the premises and enforce compliance. • Employees working in areas were noise level is high should be provided with suitable PPEs. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> Noise reduction methods should be encouraged and implemented, i.e. no idling of construction vehicles, no unnecessary hooting, no loud music equipment on the premises, etc. Comply with the EMP 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	Partial
Impact on Road and Marine Traffics							
<p>Ocean tankers delivering fuel to the terminal taking too long to turn into the terminal, leading to congestion of marine traffic around the harbour.</p>				<ul style="list-style-type: none"> Ensure that fuel delivery to the terminal is well planned and well-coordinated with scheduling communicated to neighbouring stakeholders well in advance without causing delays or congestion to marine traffic around the harbour. Any complainants received from any stakeholder with respect to delays or congestion must be recorded, investigated and corrective measures taken. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low-Medium	Low	High	None	Reversible
Fire Hazardous							
<p>Chemicals that will be procured for use during the construction of the facility could be flammable hence posing fire risks. Fire can result from incorrect handling of chemicals or incorrect storage of such chemicals, i.e. chemicals stored in contact with electrical equipment.</p> <p>The risk of fire erupting is ever present during the operation and maintenance of the facility. Vapours from fuel are dangerous. Fuel vapour are heavier than air and can flow along the ground without being detected because they are invisible. Such vapour can ignite from a flame, spark, hot surface or static electricity causing a shattering explosion.</p> <p>The site is located next to built-up areas which increase the difficulty of fighting fires.</p>				<ul style="list-style-type: none"> A fire protection and prevention plan must be developed for the facility. In the plan provision must be for evacuation plans, fire escape routes, assemble point, signage, emergency response plan, etc. Ensure that personnel is trained on fire fighting, on what to do during a fire outbreak, correct use of fire extinguishers, etc. Ensure that regular inspections are carried out on electrical connections to mechanical equipment such as pumps and pipes for any leaks. Firefighting equipment must be regularly inspected for functionality and performance and well maintained. Any complainant received with respect to fire hazardous must be investigated and corrective measures taken. Smoking around the tank farm should be had in designated areas only that are reserved for such purpose and clearly signposted. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	Yes	Partial
Visual Disturbances							
<p>Construction sites are often a hive of activities with movements of construction vehicles, machinery, equipment and overhead cranes. The site can therefore be a source of visual annoyance.</p> <p>The site is built up and served as a fish factory. The bulk of the structures are to be demolished which could lead to dust pollution with the potential to become a visual nuisance.</p>				<ul style="list-style-type: none"> Position the construction machinery and equipment and associated facilities in such a way that it is out of sight of human receptors human site. Maintain a high standard of housekeeping which includes effective waste handling and disposal. Apply dust suppression measures where possible, especially when demolition building structures or excavating building foundations during windy conditions. Any lights used for security purposes during at the construction should point inwards and outwards. Specific activities that may generate excessive dust should be avoided during high windy conditions. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct	Yes	-ve	Low	Low	High	None	Reversible
Socio-economic Environment							
Boost to the local economy				<ul style="list-style-type: none"> Ensure that local communities benefit from the operation of the facility. 			

Impact Description				Management Measures			
				<ul style="list-style-type: none"> • Source and procure good and services for the facility from local businesses • Make use of SME for work such as cleaning services, security, landscaping, etc. • Preference use of local labour/ employees 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct & indirect	Yes	+ve	Medium	High	High	None	Reversible
Creation of employment opportunities				<ul style="list-style-type: none"> • Recruitment should be done in line with the labour laws of Namibia. • Offer employment opportunities without prejudice, giving preference to women, people with disabilities and those from the marginalized communities. • Where possible preference should be given to jobseekers from within Walvis Bay. • Develop a policy on employees' well-being, educating them on the dangers of social-ills such alcohol abuse, use of drugs and HIV infections. 			
IMPACT ASSESSMENT							
Type	Cumulative	Nature	Ranking (WOM)	Ranking (WM)	Mitigation Effectiveness	Loss of Resources	Reversibility
Direct & indirect	Yes	+ve	Medium	High	High	None	Reversible

8 DESCRIPTION OF IMPACTS

A discussion of impacts to various aspects is briefly provided below. Impacts that have been identified as having a low-medium impact significance rating and higher (before mitigation) are discussed in more detail within the subsection in terms of their risks or concerns affecting the environment. A discussion on how mitigation measures are expected to decrease/increase the significance rating is also provided.

In addition, it is important to assess the natural environment using a system approach that will consider the cumulative impact of various actions. A cumulative impact refers to 'the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions'.

Cumulative impacts can result from individually minor, but collectively significant actions or activities taking place over a period of time. Cumulative effects can take place frequently and over a period of time that the effects cannot be assimilated by the environment. Cumulative impacts are also discussed in the subsections that follow.

8.1 INCREASED SUSPENDED SEDIMENTS

8.1.1 OVERVIEW

Dredging and piling activities will have direct impacts in that the seafloor is disturbed and sediment stirred up leading to increased suspended sediment and possibly turbidity in the water column within the immediate area of the action and down current from the source of the activity.

Other possible direct impacts from these activities are disruptions of marine habitat that has established itself on the jetty structures over the years. There is also strong possibility for dredging activities to cause marine traffic congestion around the harbour. These impacts are of a short duration and limited to the actual dredging operation. The impacts are therefore of low-medium significance before mitigation, but can be effectively mitigated.

During the operational phase, the channel to the jetty terminal will require some maintenance possibly at intervals of five years. The need for dredging will therefore be ascertained at that time.

8.1.2 CUMULATIVE IMPACTS

Considering all fishing operational activities taking place around the harbour, the cumulative impact from any dredging performed in the future for the routine maintenance work is expected to be low.

8.2 ATMOSPHERIC EMISSION

8.2.1 OVERVIEW

In terms of atmospheric emissions, two sources of potential impacts were identified that are likely to arise during the construction and operational phases of the proposed facility. These are dust emissions generated during the demolition of the wooden jetty and redundant building structures and gaseous emissions from construction machinery, vehicles and equipment. These emissions have the potential to alter the air quality.

The said impacts were identified as having a 'low-medium' significance before mitigation. Mitigation measures include providing suitable PPE, dust suppression by watering down with water. In terms of the emissions from construction vehicles, these will be mitigated by ensuring that all vehicles and other machinery comply with road worthy requirements and legislation in terms of allowable emissions. After mitigation the impacts caused by dust emissions are rated as having no significance and the impacts caused by vehicle emissions as having a low significance.

Point source emissions which are likely to include Sulphur dioxide (SO₂), Particulate Matter (PM₁₀), Nitrogen Oxide (NO₂) and Carbon Dioxide (CO), may slightly alter air quality but will not have a substantial impact on ambient air quality in the area. In fact, the project is located in an industrial area of Walvis Bay where ambient air quality are slightly elevated.

8.2.2 CUMULATIVE IMPACTS

Dust emissions and emissions from vehicles and equipment are cumulative in nature as they are compounded by existing activities and potential future activities in the environment. However, during the construction phase, these impacts can be mitigated to having no or low significance and during the operational phase to low-medium significance.

8.3 NOISE AND VIBRATIONS

8.3.1 OVERVIEW

Given the location of project in the industrial area, the baseline ambient noise level in the area is expected to be relatively higher. During the construction phase, cumulative noise level at the site and adjacent factories is expected to be significant. However, during the construction period, the machinery and equipment will not be operated at the same time and therefore the expected significance of the impact has been assessed as 'low-medium' before mitigation. Several mitigation measures have been proposed and once those are implemented, the significance rating is expected to decrease to 'low'.

Noise is expected to decrease during the operational phase with the only major sources being increased traffic on the street road from road tankers collecting fuel from the facility and from increased fishing boats lining up at the jetty to fill up. The significance of the impact was rated as low-medium without mitigation, and low post mitigation.

8.3.2 CUMULATIVE IMPACTS

Given all the activities taking place around the facility, the cumulative impact from noise, is considered low after mitigation.

8.4 WATER IMPACTS (SURFACE AND GROUNDWATER)

8.4.1 OVERVIEW

Potential impacts to surface and groundwater in the area that may potentially occur during the construction phase are from sources such as:

- ✚ Liquid waste including sewage that may cause pollution of groundwater.
- ✚ Insufficient provision of ablution facilities on site for construction workers and visitors to the site including poor maintenance of those facilities.

The significance of this impact was rated as low, mainly due to it being incidental in duration, although it may have a medium-high intensity. This impact is however, easily mitigated and therefore, the impact can be completely prevented resulting in no loss of resources.

Dredging has the potential to result in the contamination of dredged sediments in the water column around the jetty terminal. Without mitigation, the significance rating for this impact is low-medium and low with mitigation.

The operation of the facility entails the storage and handling of some potentially hazardous products which present an environmental contamination risk. Sources of contamination may include poor handling, lack of spill control, etc.

8.4.2 CUMULATIVE IMPACTS

Overall, the construction and operation of this facility combined with activities from the neighbouring industrial facilities, are that the expected impacts on the surface and groundwater will have some cumulative effects, but of low significance rating when mitigation measures are implemented.

8.5 WASTE GENERATION

8.5.1 OVERVIEW

The proposed development will produce waste during both phases - construction and operation. During construction, impacts are expected to be 'low-medium' (before mitigation) and 'low' (after mitigation). Mitigation measures related to the construction phase have been suggested and presented in the EMP section of the report.

8.5.2 CUMULATIVE IMPACTS

All waste generated will add to the waste generated by existing and future developments as such waste generation is cumulative in nature. Minimisation and recycling of waste must be undertaken to reduce this impact.

8.6 RESOURCE CONSUMPTION

8.6.1 OVERVIEW

Four types of resource consumption were assessed, namely, water, electricity, raw materials and fuel. During the construction, all resource consumption was assessed to be at as 'low-medium' level. Mitigation measures during construction include the following:

- ✚ For electricity to consider alternative energy with a low carbon footprint.

- ✚ For water, to consider water conservation through recycling, etc.
- ✚ Raw materials – to avoid wastage and to promote effective use of raw materials
- ✚ Recording and monitoring of fuel consumption (reduce theft through increased security measures, etc)

Based on these mitigation measures, the impacts are expected to decrease to a 'low' level.

8.6.2 CUMULATIVE IMPACTS

All four types of resource consumption (water, electricity, raw materials and fuel) have cumulative effects as they add to the existing and future use of resources. However, with mitigation measures implemented this impact is still expected to be of a low significance.

8.7 EFFECTS OF BIODIVERSITY

8.7.1 OVERVIEW

The project site is on industrial land which has been fully developed and will involve a great deal of demolition activities (wooden jetty & redundant building structures). Given the location of the project, the biodiversity around the project site is predominantly related to marine life (mammals that are likely to be impacted in the form of habitat loss and noise, dredging impacts, the impact of bright lights to birds, etc.). Birds such as flamingos have the habit of flying at night and are often disoriented by bright lights. The significance rating is low-medium without mitigation and low with mitigation.

Pile driving is relatively noisy and will have short term impacts on marine mammals that may be nearby. Uncontained chemicals and waste may wash into the ocean where it may deteriorate water quality and impact on biodiversity. The assessment of impacts on biodiversity that may occur during the construction phase were assessed as low-medium without mitigation and low with mitigation.

8.7.2 CUMULATIVE IMPACTS:

Impacts to biodiversity during the construction and operational phases can be seen to be cumulative in nature as development in this area is increasing. However, the site occurs in the industrial section of the town and therefore in line with the development priorities of the region and government.

8.8 INCIDENTS, ACCIDENTS AND POTENTIAL EMERGENCY SITUATION

8.8.1 OVERVIEW

Four main impacts were assessed linked to incidents, accidents and potential emergency situations during the construction phase.

These included:

- ✚ Pollution incidents;
- ✚ Health and safety;
- ✚ Storage of hydrocarbons; and
- ✚ Fire and / or explosions.

During construction, it was found that whilst these impacts could potentially have a 'medium-high' to 'high' intensity, they are incidental in nature and thus were assessed to be of a 'low' significance (before mitigation). In addition, several mitigation measures will be implemented which will reduce the significance of these impacts even further.

Pollution incidents and impacts associated with the storage of hydrocarbons will be mitigated through the proper storage of materials and by ensuring that spill kits are available to deal with any spills. Hydrocarbons and hazardous material will be stored properly (in bunded areas) to ensure that any pollution incidents are contained. During construction, fires are possible but would be incidental and limited to the neighbouring areas. Whilst the intensity would be 'high', the overall significance would be 'low'. In addition, a number of mitigation measures will be implemented.

During the operational phase, it was found that whilst health and safety impacts such as injury to workers or visitors to the site could potentially have a 'high' intensity, and permanent in nature should they occur, they were assessed to be of 'medium' significance before mitigation as they are limited to the site. Several mitigation measures will be implemented which will reduce the significance of these impacts to a 'low' significance.

8.8.2 CUMULATIVE

Potential impacts have no cumulative effects.

8.9 POLLUTION OF SOIL, SURFACE AND GROUNDWATER

8.9.1 OVERVIEW

The effect of the loss of containment of hazardous liquid materials from the pipelines and bulk atmospheric storage at the tank farm may pollute the soil, surface water and may potentially infiltrate into groundwater. These impacts are expected to have a medium intensity and are highly likely to occur without mitigation but will only extent locally and will only have short term effects. The significance of these impacts is therefore 'low-medium' before mitigation. With the correct designs and implementation of the recommendations in the EMP and risk assessment, these impacts can be reduced to a 'low' significance.

8.9.2 CUMULATIVE IMPACTS:

Impacts relating to incidents, accidents and potential emergency situations are not seen to be cumulative as they are limited to the specific site in question.

8.10 SOCIAL

8.10.1 OVERVIEW

From a social perspective, impacts to the following attributes were assessed:

- + visual impact;
- + safety and security;
- + traffic disruptions;
- + impact on road safety;
- + impact on road infrastructure;
- + loss of cultural heritage; and
- + loss of sense of place.

These are briefly discussed below.

8.10.2 VISUAL IMPACT

During construction, the visual impact will be limited and can be effectively mitigated. In addition, proper housekeeping will ensure that litter is kept to a minimum. Based on this, the pre-mitigation impact which is 'low' in significance, will be further decreased.

8.10.3 SAFETY AND SECURITY

During construction, crime may increase due to the influx of workers in the vicinity of the project site. This impact would be short-term in nature (i.e. limited to construction) and would potentially impact neighbouring factories. Without mitigation, the potential impact would be 'low'. However, a number of mitigation measures have been recommended.

The fact that construction employment will be managed by the appointed contractor, the impact is seen to be 'low'. During operation, the potential impact will be incidental in nature. Mitigation measures include 24-hour access control. Based on this, the impact is thought to be 'low'.

8.10.4 TRAFFIC DISRUPTIONS – BOTH MARINE AND LAND BASED

During the construction phase, marine traffic around the harbour is likely to be disrupted by dredging and piling activities taking place at the jetty terminal. Traffic using Ben Amathila Street is also likely to increase as a result of construction vehicles and machinery moving in and out of the facility. However, these will be of short-term duration (limited to construction time). Mitigation measures have been recommended.

Bulk fuel delivery to the new jetty terminal by ocean tankers is also likely to disrupt marine traffic around the harbour. There is also a possibility of fishing vessels queuing up at the 'one-stop service station' which could disrupt marine traffic. Based on the measures provided in the EMP, the impact will be 'low' after mitigation.

8.10.5 CUMULATIVE IMPACTS:

Safety and security as well as traffic disruptions are all cumulative in nature, however, with proper planning and co-ordination with other construction and development operations in the area, the cumulative impact is rated as having a 'low' significance'.

8.11 ECONOMIC

8.11.1 OVERVIEW

The development is a major capital investment and will boost the economic activities in the town of Walvis Bay during the two phases – construction and operation. The impact during the construction phase, without mitigation was rated as having a 'medium' significance and during the operational phase as 'high'. To ensure that these benefits are increased as much as possible, measures that have been recommended include amongst others, that local contractors and suppliers be used during the construction phase as far as possible.

With the implementation of these mitigation measures, the significance of these benefits will be increased to a 'high' significance during the construction phase and further increased during the operational phase.

8.11.2 CUMULATIVE IMPACTS:

Increase in the economy are cumulative in nature and will thus have a compounded positive impact. In light of the fact, there is a high unemployment in the area, this is very important.

9 MITIGATION

9.1 IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

Impact management objectives and outcomes have been provided in the EMP to ensure that the proposed development is sustainable and has not significantly negative impacts. A summary of these management objectives is provided below:

- ✦ Planning and layout of construction site is undertaken responsibly to comply with international standards and best available technology.
- ✦ Environmental awareness creation and training is undertaken throughout the construction phase in order to minimise environmental impacts and ensure compliance to relevant laws and legislation.
- ✦ It is important that environmental impacts associated with emergency procedures are minimised as far as possible.
- ✦ A safe working environment for contractors/construction workers and the public is provided.
- ✦ Proper management of site clearing is undertaken to ensure minimal environmental disturbance.
- ✦ Minimise environmental impacts associated with site establishment
- ✦ Minimal disturbances to both marine and land based traffic during the construction and operational phases of the facility.
- ✦ Proper management of labour force is undertaken to ensure that there are no security-related issues or disturbance to neighbouring residents and that there is optimal use of local labourers.
- ✦ Minimise environmental impacts associated with ablution facilities.
- ✦ Reduce the generation of waste by changing behaviours of contractors throughout the construction period of the facility.
- ✦ Re-use waste generated by the construction where possible thereby resulting in decreased waste disposal volumes.
- ✦ Waste separation and recycling must be undertaken as part of construction.
- ✦ Waste generated during the proposed development must be disposed of at musicality landfill site and proper records kept of disposal.
- ✦ Effective and safe management of hazardous and non-hazardous materials on site, in order to minimise the impact of materials on the environment.
- ✦ Minimal environmental impacts associated with the management of workshops and equipment.
- ✦ Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.
- ✦ Prevent polluted water from entering the surface and groundwater sources.
- ✦ Minimise noise disturbance to surrounding areas.
- ✦ The preservation and appropriate management of new findings should these be discovered during construction.
- ✦ Adequate reinstatement and rehabilitation of construction areas.
- ✦ Water conservation mechanisms to be implemented.
- ✦ Electricity reduction mechanisms to be implemented

9.2 ASSUMPTIONS AND LIMITATIONS

This scoping assessment was based on the information provided to Ekwao Consulting and or supplied from these sources:

- ✦ by the lead promoter
- ✦ discussions held with SCE – the technical partner
- ✦ studying the indicative conceptual layout prepared by SCE
- ✦ discussion held with Walvis Bay municipality officials
- ✦ reconnaissance of the site and surroundings

- ✚ secondary data including previous work done Ekwao Consulting

While EIAs are intended to suggest mitigation measure which may alter the design and layout of the project, this was not deemed necessary because the land intended for the development of the bulk liquid fuel storage and handling facility is a portion of a fishing factory – an industrial area which has been fully developed.

Detailed designs would be prepared post the EIA and once an ECC has been approved for the project to proceed. The EIA Consultant has made use of the information provided and made available by SCE and their professional team.

These assumptions that have been are subject to the limitations as summarised here:

- ✚ The information provided to **Ekwao** by the promoter and its technical consultants is assumed to be accurate and correct.
- ✚ The assessment has been confined to the land portion measuring $\pm 5\,500\text{ m}^2$ on the premises of an existing fishing factory. The total area covered by Erf 5022 is approximately $30\,240\text{ m}^2$. The said land portion is completely built up. It is understood that the promoter will lease the land portion ($5\,500\text{ m}^2$) from the owner and there is no need for surveying.
- ✚ Based on the information provided by WBM, the primary zoning of the land is industrial with consent use for noxious use allowed but has to be applied for from municipality. There is, therefore no need for rezoning.
- ✚ The assessment of impacts has been confined to these activities:
 - ✓ Demolition of an existing wooden jetty and replacing it with a concrete one.
 - ✓ Demolition of existing redundant building structures on the $5\,500\text{ m}^2$ premises.
 - ✓ Removal of debris from the site to an approved landfill site.
 - ✓ Clearing and preparing the site for the construction of a tank farm with a footprint of $3\,330\text{ m}^2$
 - ✓ Some dredging to deepen the route to the jetty terminal in order for it to accommodate ocean tankers delivering fuel to the facility.
 - ✓ Installation of the tank farm equipment and accessories.
 - ✓ Construction of support infrastructure (admin office, workshop, guard house, CCTV, etc.)
 - ✓ Operation and maintenance of the facility upon completion.
- ✚ Since detailed drawings were unavailable at the time of conducting the EIA, the precautionary principle has been adopted in that potential negative impacts are overstated while potential benefits to the socio-economic environment are understated.
- ✚ It has been assumed that the developer will in good faith implement the mitigation measures recommended in the EMP section of the Scoping report, commit sufficient resources to the project and to hire suitably qualified personnel for construction and installation works that may be required.
- ✚ It is further assumed that all construction work will be carried out in a professional manner, using international best practices and with all local authority standards and bylaws complied.

Notwithstanding the above, **Ekwao** is confident that these assumptions and limitations do not compromise the overall findings of the report.

10 CONCLUSION

The project is vital to the economy both at the local and regional levels. The one-stop fishing vessel refueling facility proposed by the promoter, has a range of environmental benefits, i.e. reduced traffic congestion on Ben Amathila Street, reduced gaseous emissions from trucks that normally deliver fuel into fish factories to refuel fishing vessels as well as reduced chances of incidents and accidents. Once developed and fully utilised by the fishing companies, the project has the potential to improve overall efficiencies in the sector.

Provided mitigation measures recommended in the EMP are implemented and complied with, all potential negative impacts associated with the project can be effectively mitigated.

11 RECOMMENDATION

It is recommended that an ECC be granted to the promoter for the implementation of the project subject to the terms and conditions which the Environmental Commissioner may wish to impose.

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